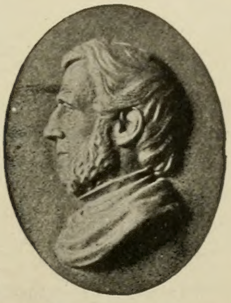
TORREYA

A Bi-Monthly Journal of Botanical Notes and News



JOHN TORREY, 1796–1873

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

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CONTENTS

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NORMAN TAYLOR
Brooklyn Botanic Garden
Brooklyn, N. Y

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TORREYA A BI-MONTHLY

Until further notice TORREYA will be issued bi-monthly. It is to be regretted that greatly increased costs have made this necessary and it will be continued in its present form only so long as the conditions which have caused its curtailment persist. The income for its publication could be greatly increased by adding to the subscribers and members, and those interested in putting TORREYA on its monthly schedule will hasten that time by actively pushing a campaign for new members and subscribers.

For the present, manuscripts and reviews submitted for publication will be printed as soon as possible, but papers by members of the Club will be given precedence over others, if our columns become crowded. Preference will usually be shown, also, to papers on local botany, especially those on the distribution of vegetation within the Local Flora Area.

[No. 12, Vol. 19 of TORREYA, comprising pp. 235–257, was issued 26 January 1920]

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February, 1920

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SOIL PREFERENCES OF SCROPHULARIACEAE

By Francis W. Pennell

Fifteen times during the course of my series of articles on the "Scrophulariaceae of the Local Florá," which appeared in Torreya during 1919, have I made the same mistake—an error which to a person with a chemical knowledge of soils may appear glaring. One correction will serve for all: for "potassic soil" read "non-calcareous and non-magnesian soil."

It is easy for those of us who are interested in plant-identity and plant-distribution to realize that for each species there is a soil of optimum chemical composition as well as one of optimum physical composition. The writer's first original scientific study was an analysis of the flora of the Serpentine Barrens of extreme southeastern Pennsylvania, and there, on soil identical in texture with that of other barren hills of the section, the Serpentine would present invariably its definite alliance of inter-growing species—certainly the obvious explanation was the presence in the soil of magnesium as a preponderant element. With nearly equal sharpness one may denote the species growing upon soils with calcium as the main determining element. Other soils may not so readily be disposed into like groups, yet the remaining aggregate possesses so much in common that for it, and especially—most wrongly—for a pronounced part of it, "acid soils," have I used the term "potassic."

My present word of correction would emphasize the importance of our local workers' studying the problem of soil-preferences of plants, and giving us just the information which my papers intended to give. The ideal Local Flora of the future will present a classification of the flora into sub-floras and associations, accounting for the distinctness of each type; also it must give

us an account of each species, surely with less attention to its nomenclature and history than the formative state of our science now makes desirable, but rather telling of its life—of its "preference" with respect to food, to texture of soil, to moisture, to light, of its manner of pollination, of its range—both portraying and explaining this—and adding yet much more to that wealth of information which an observational field-botany should make ours.

Soil-chemistry is too fundamental for plant-distribution for me to feel that this misstatement really deserves the pardon for which I am asking.

New York Botanical Garden

BOOK REVIEWS

Murrill's Nature Books*

These three books complete the set of nature and character books published by Dr. Murrill during the past year, making a total of about 1,000 pages of text, 129 halftones, and 5 colored plates. The first of the series was reviewed in Torreya for November, 1918.

In all these volumes, which are largely autobiographic, the author seeks to educate and inspire both young and old in a pleasing, indirect way that is quite original.

"The Naturalist in a Boarding School" contains the author's experiences while teaching at Bowling Green and Staunton, Virginia; short essays on various subjects; a condensed guide to bodily and mental health, character training, original epigrams and maxims on a great variety of subjects, and classified quotations from the best literature relating to man; the latter feature consisting of quotations reaching from Epictetus to Emerson and beyond—over 100 pages!

"The Natural History of Staunton" contains many original observations on all phases of natural history—beasts, birds, trees, flowers, rocks, etc.—with colored figures of the more common butterflies and a list of nature quotations.

* "The Three Young Crusoes." The Naturalist in a Boarding School." "The Natural History of Staunton, Virginia." Written and for sale by William Alphonso Murrill, Bronxwood Park, New York, $1.50 per volume, postpaid.

"The Three Young Crusoes" is all about three children wrecked on a fabulous West India island, what they saw there and what they learned by the experience.

In Billy the Boy Naturalist, reviewed in an earlier number of TORREYA, the author's gift for seeing things from the boy's point of view was noted as one of the merits of the book. In the last three volumes this gift is somewhat obscured by a mass of quotations, maxims, and epigrams, selected and composed with a catholicity of taste that would stun the average boy. Epigrams and maxims too, however piquant to grown-ups may not be always *virginibus puerisque.*

Writing books like these, even for children, involves an astonishing willingness for self-revelation on the author's part, for it sweeps away some of the reticences of our Anglo-Saxon tradition. While most of us may have passed through the phases of youth upon which the author dwells with such particularity, few have the courage to disclose them. To alter slightly a phrase of Stevenson, who in rare degree understood writing for children, some of us might think that while we are quite capable of writing books like these we prefer not to write them. But the preferences of adults with Anglo-Saxon reticences, who may object to the books, is not likely to weigh much against them so far as children are concerned. And for young people there is in them an undeniable fund of information on natural history.

THE EDITOR.

PROCEEDINGS OF THE CLUB

OCTOBER 29, 1919

The meeting was held in the Morphological Laboratory of the New York Botanical Garden at 3:30 P.M., Vice-President Barnhart presiding. There were twenty-eight persons present.

The minutes of the meeting held October 14 were read and approved. Dr. Isaac Levin, Mr. Arthur H. Thomas, were nominated for membership.

Dr. Britton spoke of the completion of the new greenhouse presented to the New York Botanical Garden by Messrs. Daniel

and Murry Guggenheim, and suggested that the Club hold a Field meeting at the time of the formal opening of this green house, Saturday, November 8, and also at the lectures to be held the three following Saturday afternoons at the green house. On the motion of Dr. Britton, the chairman of the Field Committee was directed to make the announcements in the Bulletin of the New York Academy of Sciences.

Mrs. Britton mentioned communications which she and the Secretary of the Club had received from a former Secretary, Mrs. B. LeBrun, regarding the sale of certain water colors done by Mrs. Ranseur. These illustrations were exhibited to the Club.

Prof. Harper spoke of the opportunity to hear a lecture on the flora of New Zealand in view of the fact that the program committee had secured the consent of Professor A. H. Cockayne, of the Agricultural Department of New Zealand, to lecture on the Tuesday evening meeting, November 11.

The Secretary read a letter from Mr. George L. Moxley, of 5417 Santa Monica Boulevard, Los Angeles, Calif., regarding the exchange of the Club's publications for specimens which he was now collecting and preparing. The letter was referred to Dr. Britton with power.

The election of Dr. Levin and Mr. Thomas followed.

Dr. Britton exhibited an interesting specimen of a species of Sedge, which consisted of a fruiting mass subtended by the involucral bracts of a leaf. This sedge, a *Scirpodendron*, a native of the Philippines and other Eastern Islands, is probably the largest sedge in the world.

Mrs. Britton spoke of the late blooming of *Rhododendron catawbiense* in the New York Botanical Garden and stated that the Japanese quince and lilacs were also in bloom. Dr. Harper also noted that pears were in bloom at the Columbia campus.

Dr. Marshall A. Howe, in directing attention to several bouquets of dahlias, remarked that the Botanical Garden's dahlia border was enjoying an unusually successful season, due perhaps to the fact that the rainfall during the summer and autumn had been about five inches in excess of the normal. About 340

varieties, represented by somewhat more than 600 plants, had reached the blossoming stage. Attention was directed especially to the variety *Juarezii* which is supposed to represent rather accurately the original "cactus" dahlia as first known in Europe in 1872.

The Scientific program as announced was as follows: Dr. John H. Barnhart, "Wooden Flowers"; Dr. William A. Murrill, "Notes on Fungi"; Dr. Francis W. Pennell, "Field Excursions"; Dr. P. A. Rydberg "Notes on *Philotria*." The following extracts were furnished by the speakers.

"Dr. Barnhart exhibited two fine specimens of 'wooden flowers' recently presented to the museum of the New York Botanical Garden by Dr. L. A. Wailes of New Orleans, and remarked upon the cause of these curious malformations. They are found in Central America, where they are known to the natives as 'flor de madera' or 'flor de infierno.' They may be classified as galls and are perhaps the only known kind of galls produced by parasitic flowering plants; being the modification produced in host-tissues by the base of a mistletoe of the genus *Phoradendron*, this modification persisting after the parasite had dropped from the host. Several good published illustrations of the structure were shown."

"Collecting Fungi in Virginia."

"During the latter half of July 1919, the writer made a tour through parts of southwest Virginia, returning by way of Blue Ridge Springs, Bedford City, Lynchburg, and Falls Church. A drought early in the month was followed by over a week of rain, which brought out an unusually large and diversified crop of fungi. These were studied and collected for several days in the vicinity of Blacksburg, Virginia, at an elevation of 2,200 feet, where the woodlands are mostly oak-chestnut and the rocks Trenton limestones or subcarboniferous shales and sandstones.

"Trees were attacked by destructive polypores, among them *Bjerkandera adusta*, *Coriolus versicolor*, *Daedalea quercina*, *Elfvingia lobata*, *Fulvifomes Robiniae*, *Grifolia Berkeleyi*, *Laetiporus speciosus*, *Porodaedalea Pini*, *Trametes robiniophila* and *Tyromyces Spraguei*. The most abundant of these were prob-

ably *Fulvifomes Robiniae* on black locust and *Elfvingia lobata* on various species of oak, hickory, and maple.

"Of the fleshy forms that were eaten, the following might be mentioned: *Chanterel Chantarellus*, *Craterellus cornucopioides*, *Lycoperdon cyathiforme*, *L. gemmatum*, *Cortinarius semisanguineus*, *Vaginata plumbea*, *Lactaria volema*, *L. corrugis*, *Hydnum repandum*, *Boletus bicolor*, *Pluteus cervinus*, and *Hypomyces lactifluorum*. Those specially avoided where species of *Venenarius* and brilliant clusters of *Clitocybe illudens*."

"One of the most interesting observations was made at Lynchburg at the corner of Tenth and Harrison Streets. Here stood an English Walnut tree over a hundred years old, which measured seven feet in circumference and about sixty feet in height, and had borne quantities of good nuts until about 1915. Since then, however, the nuts had been diseased and for the most part worthless. Upon closer examination, some of the green fruits hanging on the tree were seen to be partially blackened, while many entirely blackened and decayed fruits were on the ground. This walnut blight, *Bacterium juglandis*, has been known since 1900 on the Pacific coast, where it is considered a most serious disease and one not amenable to treatment."

"Dr. Pennell gave a résumé of the work done by the Field Committee in connection with the summer's field excursions. He pointed out some of the difficulties of the situation and urged a more hearty cooperation of the members of the club in the future. The club voted to refer the questions to Dr. Pennell with the request that he make further recommendations for consideration at the Annual meeting."

"Dr. Rydberg presented some notes on *Philotria*. In the eastern species, the stamiate flowers have been described as having oblong or elliptical petals and break loose from the short pedical to float on the surface during pollination. Mr. R. Hitchcock of Ithaca had sent in some specimens collected in Lake Cayuaga, in which the petals are narrowly linear and the pedicels elongate so that the flower reaches the surface before it breaks loose. In these respects the specimens agreed with *P. iowensis* Wylie, which hitherto had been found only in Iowa

and in a pond near Denver, Colorado. Some peculiarities in the pistillate flowers were also pointed out."

Adjournment followed. B. O. Dodge,
Secretary.

NEWS ITEMS

At a dinner for botanists given by the Missouri Botanical Garden during the St. Louis meeting two rather unusual vegetables were served. *Dasheen en cassorole* and *Arracacha.* The latter is a Venezuelan plant, *Arracacia xanthorrhiza*, introduced through the Foreign Seed and Plant Introduction Office at Washington, and said to be the first grown in the United States and served at a public banquet. The dasheen is *Colocasia esculenta*, a more familiar plant, grown commercially from South Carolina to Florida and Texas, but not yet widely known near New York.

The Ecological Society of America elected the following officers at the Christmas meetings. *President*, Barrington Moore; *Vice-President*, G. E. Nichols; and *Secretary-Treasurer*, A. O. Weese. The president was reelected and, after a several month's trip to the Southwest and California, will be at 925 Park Avenue, N. Y. after March 27.

Dr. R. M. Harper, after a short visit to New York, has returned to Alabama. His address until further notice will be University, Ala.

Dr. B. E. Livingston, of Johns Hopkins University, has been appointed Permanent Secretary of the American Association for the Advancement of Science. He will retain his position at the University and spend one or two days a week at Washington.

Mr. Robert Cushman Murphy has just returned from the islands off the coast of Peru. While most of his material is zoological he collected all the flowering plants known from the islands. Some are absolute deserts, a few with only lichens and mosses, others with as many as 15 flowering plants. One island contains a fringe of a single beach species along the coast, then for 1000 feet in elevation nothing but bare rock and soil, and finally a single specimen of an Acacia-like tree, not over 3 feet high. The specimens from these unique islands have been presented to the Brooklyn Botanic Garden.

The Torrey Botanical Club

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SOME LOCAL NAMES OF PLANTS—III*

By W. L. McAtee

The present contribution to an enumeration of the local names of American plants is compiled from several sources. It includes names learned by the writer on field trips, both official and personal, others kindly contributed by friends (to whom credit is given in connection with the names), local terms gleaned from herbarium sheets and a few from old books. In the latter case opportunity was taken to rescue from apparent oblivion the more interesting plant appellations contained in the Arctic Zoology (T. Pennant, 1785) and in Travels in the Confederation (1783–4, Schoepf, J. D., translated by Alfred J. Morrison, 1911).

Whenever possible the locality where each name is or has been used is cited. Like previous contributions this list is numbered and indexed. As a point of interest, it may be mentioned that of the 95 specific groups of plants catalogued 52 were named by Linnaeus. Original authorities for names only are cited, and except in the case of Linnaeus are spelled out.

Polypodiaceae

1. *Pteridium aquilinum* L.—Po man's soap, Alabama. (E. G. Holt.)

Equisetaceae

2. *Equisetum* spp.—Fishpoles, Traverse City, Mich.

Pinaceae

3. *Pinus strobus* L.—The name cork pine, applied to mature trees of this species, appears not to be recorded in current manuals and glossaries.

* No. 1 of this series was published in Torreya, 13: 225–236, 1913, and No. 2 in Torreya, 16: 235–242, 1916.

[No. 1, Vol. 20 of Torreya, comprising pp. 1–16, was issued 1 April 1920]

4. *Tsuga canadensis* L.—Weymouth fir, Juniata River, Pa. (Schoepf, I, p. 226.)

Zannichelliaceae

5. *Potamogeton americanus* Chamisso and Schlechtendahl.—Flag, cane grass, Reelfoot Lake, Tenn.

6. *Potamogeton pectinatus* L.—Potato moss, duck moss, duck grass, Salt Lake Valley, Utah. (A. Wetmore.)

7. *Ruppia maritima* L.—Redhead grass, Horn Point, Va.

8. *Naias flexilis* Willdenow.—Cedar grass, Horn Point, Va.

Scheuchzeriaceae

9. *Triglochin maritima* L.—Goose grass, Lower Klamath Lake, Calif.

Vallisneriaceae

10. *Vallisneria spiralis* L.—Celery grass, Horn Point, Va.; Canvas-back grass, Chesapeake Bay, Md. (Sharpless in Audubon, Ornithological Biography, 5, 1839, p. 137.)

Gramineae

11. *Echinochloa crus-galli* L.—Whiteshank, red-shank, Brunswick Co., S. C.; cat-tail, Charleston, S. C., Savannah, Ga.

12. *Zizaniopsis miliacea* Michaux.—Sword grass, Goose Creek, S. C.

13. *Zizania aquatica* L.—Water tare-grass (Pennant, II, p. 263); reed is the name that has long been, and still is in use in the vicinity of Philadelphia, Pa., and Wilmington, Del.

14. *Calamagrostis inexpansa* A. Gray.—Wild redtop, Lower Klamath Lake, Calif.

15. *Spartina michauxiana* Hitchcock.—Prairie grass, ramrod grass, Peruque, Mo.; lowland grass, sawgrass, rip-gut, Hartmann, Mo.

15a. *Scolochloa festucacea* Willdenow.—Wild Rice, North Dakota. (F. P. Metcalf.)

Cyperaceae

16. *Eleocharis palustris* L.—Wire grass, Salt Lake Valley, Utah. (A. Wetmore.)

17. *Scirpus occidentalis* S. Watson.—Tule, Salt Lake Valley, Utah. (A. Wetmore.)

18. *Scirpus paludosus* A. Nelson.—Tule, bayonet grass, Salt Lake Valley, Utah (A. Wetmore); latter name used in North Dakota also. (F. P. Metcalf.)

19. *Rhynochspora corniculata* Lamarck.—Spade grass, Savannah, Ga.

PONTEDERIACEAE

20. *Heteranthera dubia* Jacquin.—Buffalo grass, Reelfoot Lake, Tenn. This is the plant to which the name buffalo grass is most frequently applied; however the term is loosely used to denote any submerged vegetation other than cedar moss (*Ceratophyllum*) to which buffalo fish resort; in this way sometimes applied to *Naias flexilis* and *Philotria canadensis.*

JUNCACEAE

21. *Juncus effusus* L.—Sugar grass, Lower Klamath Lake, Calif.

MELANTHACEAE

22. *Veratrum viride* Aiton.—Rattle-snake root. (Schoepf, I, p. 319.)

LILIACEAE

23. *Brodiaea* sp.—Wild onion, ground-nut, Los Angeles, Calif.

24. *Yucca gloriosa* L.—Palmetto, Florida. (Schoepf, II, p. 243.)

TRILLIACEAE

25. *Trillium* spp.—Corn lilies, Traverse City, Mich.

SMILACACEAE

26. *Smilax herbacea* L.—Field yam-root, Manitowoc, Wis., R. M. Strong; Bohea tea, Mercersburg, Pa., Detwiller.

27. *Smilax bona-nox* L.—Stretch-berry, Charleston, S. C., J. W. Harshberger.

27*a*. *Smilax* spp.—Bull-grip, Goose Creek, S. C.

IRIDACEAE

28. *Iris verna* L.—Violet, South Carolina. (Schoepf, II, p. 138.)

Orchidaceae

29. *Cypripedium* spp.—Pitcher plant, Traverse City, Mich.

Myricaceae

30. *Myrica* sp.—Low mucker, undoubtedly a corruption of low myrtle, Goose Creek, S. C.

Salicaceae

31. *Salix amygdaloides* Anderson.—Black willow, Salt Lake Valley, Utah (A. Wetmore.)

32. *Salix exigua* Nuttall.—Gray willow, Salt Lake Valley, Utah. (A. Wetmore.)

Betulaceae

33. *Carpinus caroliniana* Walter.—Black beech, Admiral, Md. (Francis Harper.)

Fagaceae

34. *Quercus ilicifolia* Wangenheim.—Bush oak (Schoepf, I, p. 159.)

Ulmaceae

35. *Celtis douglasii* Planchon.—Wild orange, Lyle, Wash. (G. G. Cantwell.)

Urticaceae

36. *Pilea pumila* L.—Bastard nettle, dead nettle, silverweed. (Stokes, James. Med. and Surg. Rep. 17, 1867, p. 373.)

Aristolochiaceae

37. *Asarum* sp.—Coltsfoot. (Schoepf, I, p. 319.)

Chenopodiaceae

38. *Allenrolfea utahensis* Tidestrom.—Saltweed, Salt Lake Valley, Utah. (A. Wetmore.)

39. *Salicornia europea* L.—Saltweed, Salt Lake Valley, Utah. (A. Wetmore.)

40. *Salicornia* sp.—Sea cress, Wallops Id., Va.

Ceratophyllaceae

41. *Ceratophyllum demersum* L.—Fish-blankets, Oakley, S. C. (Nathaniel Heyward.); cedar moss, Reelfoot Lake, Tenn.

Cabombaceae

42. *Brasenia schreberi* Gmelin.—Egg bonnet, purple bonnet, Reelfoot Lake, Tenn.

Nelumbonaceae

43. *Nelumbo lutea* Willdenow.—Jacquinot, Peruque, Mo., Alligator buttons, Goose Creek, S. C.; bonnet, yonkapin bonnet, Reelfoot Lake, Tenn.

Nymphaeaceae

44. *Nymphaea advena* Solander.—Mulefoot, mulefoot lily, mulefoot bonnet, Reelfoot Lake, Tenn.

45. *Castalia odorata* Dryander.—Alligator bonnet, Cameron Parish, La. (E. G. Holt.)

Magnoliaceae

46. *Magnolia virginiana* L.—Brewster, Brown's Mills, N. J. (Alex. McElwee.)

47. *Magnolia acuminata* L.—Blue or mountain magnolia. (Schoepf, I, p. 227.)

48. *Magnolia grandiflora* L.—Laurel-tree. (Pennant, II, p. 411.)

Berberidaceae

49. *Achlys triphylla* De Candolle.—Vanilla plant, Carson, Wash. (G.G. Cantwell.)

50. *Podophyllum peltatum* L.—Mug-apple. (Pennant, II, p. 326.)

Menispermaceae

51. *Cocculus carolinus* L.—Sarsaparilla, used as a tonic, Texas. (Lincecum.)

Cruciferae

52. *Bursa bursa-pastoris* L.—Hen pepper, pepper-weed, Marion, Ind.

Capparidaceae

53. *Cleome serrulata* Pursh.—Skunk-weed, several western states. (A. Wetmore.)

Rosaceae

54. *Cercocarpus* spp.—Rabbit brush, quail brush, Apache plume, southern Arizona. (A. Wetmore.)

Amygdalaceae

55. *Prunus americana* Marshall.—Indian plum, Pennsylvania. (Schoepf. I, p. 165.)

56. *Prunus pumila* L.—Butter plum, La Pointe, Wis. (I. A. Lapham.)

Fabaceae

57. *Arachis hypogoea* L.—Been-nuts, Bladensburg, Md. (Schoepf, I, p. 354.)

58. *Aeschynomene virginica* L.—Indigo, Savannah, Ga.

59. *Daubentonia longifolia* Cavanilles.—Seenie bean, Indigo, Cameron Parish, La. (E. G. Holt.)

Simaroubaceae

60. *Holacantha emoryi* A. Gray.—Crucifixion thorn, Higley, Ariz. (E. G. Holt.)

Meliaceae

61. *Melia azederach* L.—Paternoster tree, Virginia. (Schoepf, II, p. 77.)

Anacardiaceae

62. *Rhus copallina* L.—Black sumach, Texas. (Lincecum.)

63. *Toxicodendron radicans* L.—Poison ash, Mercersburg, Pa. (Detwiller.); shoestring weed, Church's Id., N. C.

Ilacaceae

64. *Ilex cassine* L.—Japan, North Carolina, (Schoepf, II, p. 113.) This seems simply a corruption of youpon, but probably was in local use as the author quoted repeats the word in the name of a drink, "Japan tea."

65. *Ilex vomitoria* Aiton.—Deerberry, Texas. (Lincecum.)

66. *Ilex glabra* L.—Bear-bush, Brown's Mills, N. J. (Alex. McElwee.)

67. *Ilex verticillata* L.—Winterberry, Mercersburg, Pa. (Detwiller.); northern holly, Traverse City, Mich.

Celastraceae

68. *Celastrus scandens* L.—Redroot, Mercersburg, Pa. (Detwiller.)

Aceraceae

69. *Acer negundo* L.—White ash. (Schoepf, I, p. 319.)

Sapindaceae

70. *Sapindus drummondii* Hooker and Arnott.—Wild China, groves of the trees called "China motts," Midland, Texas. (E. G. Holt.)

Vitaceae

71. *Vitis labrusca* L.—Raccoon grape, Coatsville, Pa. (Tatnall.); coon-grape, Ashland, Del. (A. Commons.); swamp grape, Tennessee. (T. V. Munson.)

72. *Vitis berlandieri* Planchon.—Fall or winter grape. (T. V. M.)

73. *Vitis cinerea* Engelmann.—Bunch grape, Gumboro, Del. (A. Commons.); sweet winter grape. (T. V. M.)

74. *Vitis cordifolia* Michaux.—Sour winter grape. (T. V. M.)

75. *Vitis coriacea* Shuttleworth.—Leatherleaf, Caloosa or Florida grape. (T. V. M.)

76. *Vitis aestivalis* var. *lincecumi* Munson.—Postoak or turkey grape. T. V. M.)

77. *Vitis munsoniana* Simpson.—Everbearing, bird or mustang grape. (T. V. M.)

78. *Vitis palmata* Vahl.—Cat grape. (T. V. M.)

79. *Vitis rupestris* Scheele.—Sand-beach grape. (T. V. M.)

80. *Vitis simpsoni* Munson.—Rusty winter grape. (T. V. M.)

A number of the grape names here given were obtained from a herbarium set made up by T. V. Munson. They may be in part, mere personal inventions, but on the other hand, some of them appear to be local names collected by this grape specialist. Many of Munson's grape names are included in Bailey's "cyclopedia of Horticulture," but those here recorded have not yet found recognition in modern manuals.

81. *Ampelopsis cordata* Michaux.—Raccoon, or swamp grape, Louisiana. (Clarendon Peck.)

Malvaceae

82. *Sida* sp.—Tea-weed, Goose Creek, S. C.; Savannah, Ga.

Thymeleaceae

83. *Dirca palustris* L.—Wickerby bush, Moosehead Lake, Me. (C. H. Goodwin.)

Onagraceae

84. *Jussiaea diffusa* Forskal.—Water pusley, Reelfoot Lake, Tenn.

Ammiaceae

85. *Erigenia bulbosa* Michaux.—Turkeyfoot, Marion, Ind.

Cornaceae

86. *Cornus stolonifera* Michaux.—Red willow, Traverse City, Mich.

Ericaceae

87. *Arctostaphylos uva-ursi* L.—Mealyberry, Nantucket, Mass. (J. W. Harshberger.)

This name is also used in Pine-barren region of New Jersey.

Apocynaceae

88. *Carissa carandas* L.—Crown-of-thorns, cultivated, Bradentown, Fla.

Asclepiadaceae

89. *Asclepias tuberosa* L.—Indian-plume, Indian-paint, Traverse City, Mich.

Verbenaceae

90. *Callicarpa americana* L.—Sourberry, Virginia. (Schoepf, II, p. 82.); Spanish mulberry, Texas. (Lincecum.)

Labiatae

91. *Clinopodium nepeta* L.—Sheepmint, Cleveland Park, D. C. (H. L. Viereck.)

92. *Cunila origanoides* L.—Pennyroyal. (Schoepf, I, p. 319.)

Scrophulariaceae

93. *Verbascum thapsus* L.—Goose-grass. (Schoepf, I, p. 196.)

94. *Paulownia tomentosa* Thunberg.—Blue catalpa, Washington, D. C.

Rubiaceae

95. *Cephalanthus occidentalis* L.—Buckbrush, Reelfoot Lake, Tenn.; Peruque, Mo.

96. *Mitchella repens* L.—Squawberry, Traverse Ciy, Mich.

97. *Diodia virginiana* L.—Jacob's-ladder, Savannah, Ga.

Caprifoliaceae

98. *Lonicera dioica* L.—Bittersweet, Milwaukee, Wis. (I. A. Lapham.)

99. *Symphoricarpos occidentalis* Hooker.—Buckbrush, badgerbrush, Pingree, Binford, N. Dak. (D. C. Mabbott.)

Campanulaceae

100. *Campanula rotundifolia* L.—Blue or heatherbells, Traverse City, Mich.

Compositae

101. *Baccharis halimifolia* L.—Waterbush, water-gall, Horn Point, Va.

102. *Anaphalis margaritacea* L.—Indian tobacco, Traverse City, Mich.

103. *Rudbeckia hirta* L.—Black-eyed daisy, Baltimore, Md.

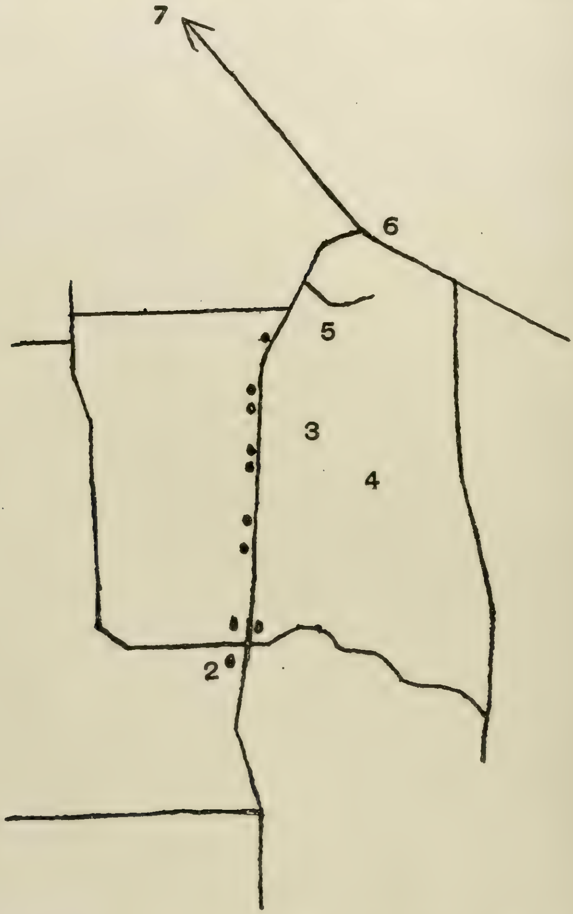
104. *Rudbeckia montana* A. Gray.—Niggerhead, Uintah Mts., Utah. (J. Silver.)

Index

THE HAUNTS OF RHODODENDRON MAXIMUM

BY STEWART H. BURNHAM

Saturday, November 19, 1904, was a very fine mild Indian Summer's day; smoky and hazy but too warm for comfort when climbing hills. The examination of the great laurel brought from Michigan Hollow swamp, a week ago, excited my curiosity and desire to find this shrub growing wild. *Rhododendron*



Sketch showing the station or *Rhododendron maximum* in Michigan Hollow swamp. 1, West Danby; 2, School house; 3, Station for the great laurel; 4, Source of Michigan creek, flowing in a southerly direction: 5, a small pond, source of Tenmile creek, flowing in a northerly direction; 6, Danby; 7, To Ithaca, N. Y.

maximum L. is a rare plant in New York state: something like* "a dozen reported stations . . . scattered from the Adirondacks to Chautauqua Co."; but it occurs quite abundantly on the Pocono plateau in Pennsylvania. However, according to Dr. C. H. Peck,† this showy shrub grows in great profusion about Barryville and in other places in Sullivan county.

The morning train on the Lehigh Valley railroad, from Ithaca was taken to West Danby, ten miles south of the city. It was with some hesitation that I started out in search of this rare shrub, being told that I would not find it, as other collectors had often failed.

Soon after leaving West Danby station, 872 feet above sea level, the ascending road follows the meanderings of a rocky rivulet. For some distance the woods are preserved on both sides of the road; although further east quite a territory had been cut over. It is a very pretty spot, the ground being covered with mosses and ferns, specially of the genera *Hypnum* and *Dryopteris*. *Hylocomium proliferum* (L.) Lindb. was abundant; and *Pogonatum brevicaule* (Brid.) P. Bv., on moist roadside banks. Up the hill, thickets were largely made up of sassafras, witch-hazel and hawthorn. A few unfruited plants of *Lycopodium clavatum* L., *L. complanatum flabelliforme* Fernald and *L. obscurum* L. were found; and as far as observation was made, neither of the first two clubmosses are as abundant in the Cayuga flora as in the Adirondack forests.

To where one enters the swampy woods it is about two miles from West Danby and one from Danby. The rail fence to be followed lies between two houses south and two houses north; with moderately large slate-colored barns standing on the east side of the road. The fence should be followed down to the "jog" in the woods; then one should go north a few paces, then directly east, a five minutes walk to the moister shades of the wood.

Michigan Hollow swamp covers several hundred acres, but in less than a quarter of an hour after entering the woods, the great laurel was found. The muddy bottom of partly desiccated

* W. R. Dudley, The Cayuga Flora, 59. 1886.

† N. Y. State Mus. Rep. 47: 31. 1894 Bot. ed.

pools were covered with mats of golden saxifrage, *Chrysosplenium americanum* Schwein., swamp saxifrage, *Micranthes pennsylvanica* (L.) Haw, and the naked bishop's-cap, *Mitella nuda* L. There are quite large white pines and black ash, with much fallen timber and some underbrush in the immediate vicinity. On account of the coriaceous leaves, the great laurel, was easily seen in the leafless woods, but it might be readily passed by in midsummer.

The space covered by *Rhododendron maximum* L. near West Danby is within a circumference of six hundred feet, which is considerably larger than the area ascribed to it in the Cayuga Flora, *i. e.*" 30 meters by 10." There were about seven distinct patches within the area: but one or two were slowly dying. In the wild state, as in Michigan Hollow, the shrubs have a tendency to form circular growths: and this is brought about by the reclining flexuous branches, taking root on becoming buried in the leaf mold and mud—nature performing the work of reproducing the plant by layering. The shrub attains no great height, on account of this natural process, although some of the central stems were at least fifteen feet high and an inch or two in diameter.

The bark on the older stems is rather close-flaky and grayish brown, higher up there is a tendency to exfoliate in light gray, thin plates; and in the leafy portion the young bark is reddish intermixed with gray patches. The wood is whitish and moderately hard. The evergreen leaves, clustered near and at the ends of the branches, are very thick, lance-oblong, about nine inches long including the reddish petiole, one to three inches wide, acute, narrowed at the base, bright green above, paler and smooth or sometimes rusty beneath, and the margin somewhat revolute. At this season, the crowded leaves assume a drooping position. Next season's flower buds were conspicuous, ovate in outline with foliaceous scales, and terminated the branches. Old seed capsules persisted on some of the branches.

The great laurel is slowly spreading and is in no danger of being exterminated, unless the wood choppers reach this portion of the swamp. Further south, in the swamp, some denudation

has taken place. A few fungi were collected, and specimens of *Dryopteris Boottii* (Tuck.) Underw. and *D. intermedia* (Muhl.) A. Gray. One cannot but note the absence of the canoe and gray birches from the Cayuga flora, but the black and yellow birches are met with frequently. There are some fine yellow birches in this section. White, pitch and red pines occur; two fine trees of *Pinus resinosa* Ait., near the schoolhouse south of Danby, at the highest elevation of the road, 1,550 feet above sea level. Boughs of the red pine with cones attached were brought to the city for decorative purposes, and during the evening the cones gradually opened with a noticeable sound.

I climbed the high hill, southeast of West Danby station, 1,577 feet above the sea, in the late afternoon. The sides of the hill had suffered from a forest fire, probably during 1903, and but little timber was left. In the soil were many small flat stones, and near the pine clad summit were thickets of New Jersey tea, *Ceanothus americanus* L. and dockmackie, *Viburnum acerifolium* L. The haze so filled the valley that but little of the landscape could be seen, but the rolling hills, enshrouded as they were, added to the picturesqueness of the scene. On descending, the fruit of deerberry, *Polycodium stamineum* (L.) Greene, fallen to the ground, was found, in general appearance, reminding one of large green service-berries.

The following Monday, I consulted with Mr. Robert Shore, head gardener at the University, about starting the great laurel. He said the best method is by layering, when attached to the shrub, or by rooting the young growth to which a heel (node of older growth) is attached. The latter method was the only one opened to me, and after cutting away three fourths of the leaf, the cuttings were put in the greenhouse. However, I was unsuccessful, as all the cuttings finally died.

Hudson Falls,
New York

SHORTER NOTES

Tilia Europaea in Oregon.—Dr. Gleason's interesting note on *Rhamnus dahurica* in Michigan calls forcibly to mind a similar

experience of the writer in finding an exotic tree naturalized in a spot where it could by no ordinary possibility have been expected. On June 19, 1919, while collecting in the Calapooia Mountains along Smith River, near the northern boundary of Douglas County, Oregon, in a very remote and thinly-settled district about twenty miles to the west of the Southern Pacific Railroad, a tree was observed in a dense thicket of alders and Douglas firs near the roadside that attracted instant attention. No dwelling or other evidence of civilization was anywhere in sight, and the "forest primeval" had apparently never been disturbed. The tree stood about 40 feet in height, and was some six inches in diameter above the base. At the time it was in full flower, and was plainly a linden—a group not represented in the indigenous flora of Oregon, although occasionally found among the shade-trees in the larger towns. Closer examination of the flowers showed that it was typical *Tilia europaea* L.—a tree as little to be expected in the mountain-forest as a fan-palm. The mystery was complete; but it was somewhat dispelled when, on arriving at the little post-office of Gunter, a few hundred yards further on, the stalwart mountaineer who acted as postmaster informed us that some thirty years before an Englishman had taken up a homestead near the spot and engaged in bee-culture—a venture that ended in speedy failure; and the linden was probably a relic of his undertaking, this tree being a favorite with English apiarists. The forest had speedily resumed its sway, and no trace even of a clearing remained; but the linden had grown to a vigorous maturity, and will doubtless live to puzzle the next collector who may penetrate to this remote and little-known district.

JAMES C. NELSON.

BOOK REVIEWS

East's and Jones's Inbreeding and Outbreeding*

"A man should be very careful in the selection of his parents," once said the poet Heine, half bitterly, half jestingly. But

* East, E. M. and Jones, D. E. Inbreeding and Outbreeding; Their genetic and sociological significance. Pp. 285. Illustrated. J. B. Lippincott Co. Philadelphia. 1919. Price, $2.50.

even though one's heredity has been well looked after by preceding generations, one's environment also needs careful consideration if one desires to make the most of life. So the far-seeing human being must consider the laws underlying inheritance as applied to his food crops, his meat animals, his pleasure plants and his pleasure animals, for after all, these make up much of his environment.

And it is certain phases of these problems of heredity in plants and animals, including man, which Professors East and Jones have set forth in very interesting, simple, clear and trustworthy fashion in their "Inbreeding and Outbreeding." "Historically," say the authors, "these are old, old problems, practical problems of considerable significance bound up with man's gravest affairs, his marriage customs and his means of subsistence." The value of inbreeding and outbreeding in the establishment and creation of new breeds of domestic animals is still a much discussed question among breeders of live stock. How to produce the largest yields of certain staple grains, such as corn, from an acre of land, is one of the pressing problems of the present and of the near future, since it has a direct bearing on questions involving labor, food supply and increase in population. That more fruit is obtained per unit area from tomato plants grown from certain kinds of outcrossed seed is probably unknown to most truckers, seedsmen, canning-factory managers and home gardeners. Over laws regulating the marriage of first cousins and other near relatives, our lawmakers still dispute. And of the effects, good and bad, of immigration, the "melting pot" and the intermingling of races through marriage, even the intelligent public is still largely uninformed from a biological standpoint. Much light is thrown on these fascinating and important questions as well as upon many others, such as heredity and disease, reproduction in animals and plants, the increased vigor of hybrids in many animals and plants over that of their parents, the mechanism of heredity, sterility, and the inheritance of genius in man. While this book is designed especially for those interested in general biology, the authors had also in mind the farmer and the live stock breeder, and *especially* the physician,

the clergyman, the social worker, the penologist and the statesman for "all we would ask is that 'these' give conscientious consideration to the facts of heredity as a guiding principle in the solution of the problems of the family with which they have to do. No questions are so hedged about with superstition, with irrational tradition, with religious dogma, as those which concern sex and reproduction; no problems are more delicate, more difficult, than those which seek the direction of human evolution; yet after all, man is an animal and must be dealt with as such. Civic law he may escape, to natural law there is no immunity."

ORLAND E. WHITE.

Recknagel's and Bentley's Forest Management*

There is at present an active movement, led by professional foresters with Lt. Col. Graves, Chief of the U. S. Forest Service, at their head, for the application of forestry to privately owned timberlands in the United States. These lands contain three quarters of the standing timber in the United States, and are for the most part being cut without regard to the future. Whether or not Recknagel's and Bentley's "Forest Management" was planned by the authors as a part of this movement, aside from the avowed purpose of stimulating forestry practice in general, we do not know. In any case the book fits in admirably and is most timely.

The authors do not claim originality for their work, admitting that most of their material is already contained in the technical literature already published in this country. Nor do they aim at popular treatment. Their purpose is to present the subject in such a way that it can be understood and applied by the owners of forest lands who are not professional foresters. This does not apply to the farmer and owner of a small woodlot for whom Ferguson has already written "Farm Forestry."† In France the bulk of the forests are held by private owners as in this country, but forestry is universally practiced. Most of the

* Recknagel, A.B., and Bentley, J., Jr., Forest Management, xiii + 269 pages, 26 figures, John Wiley and Sons, New York, 1919, net $2.50.

† Ferguson, J. A., Farm Forestry, viii + 241 pages, illustrated, John Wiley and Sons, New York.

owners cannot afford the services of a highly trained forester. They themselves understand enough forestry to be able to manage their lands intelligently with the help of one or more forest guards or rangers. It appears to be the purpose of Recknagel and Bentley to assist in building up this type of owner in the United States. If this can be done the gain to the country will be incalculable.

The book gives briefly but clearly the essentials of the four branches of Forest Management, namely: (1) forest mensuration or the measurement of the tree crop including growth, (2) forest organization or regulation of the cut so as to secure regular periodic returns from the forest, (3) forest finance, a complex but important phase of the subject, and (4) forest administration or the organization and personnel of the force necessary to protect and control the forest.

It would be useless to pretend that such a subject as forest management can be readily understood and applied by the layman. It will require time and study, and often at the outset the assistance of expert advice. But this book will be of great assistance, and make possible to the forest owner an understanding of how to go about the matter, and of what returns he may expect on his outlay.

The book has still another field of usefulness. It is sufficiently detailed and accurate to be of much value to the professional forester as a convenient handbook of reference in which he may easily find certain formulae and tables which he could not possibly keep in his head. On the whole therefore the book is a valuable and welcome addition to forestry literature.

Barrington Moore

PROCEEDINGS OF THE CLUB

November 11, 1919

The meeting was held at the American Museum of Natural History at 8.15 P.M., President Richards presiding. There were fifty persons present.

The usual business was dispensed with and Professor A. H. Cockayne, of the Agricultural Department of New Zealand, gave an illustrated lecture on "Botanical Features of the Flora of New Zealand." A general discussion followed the lecture, after which the meeting was adjourned.

B. O. Dodge,
Secretary

NEWS ITEMS

Dr. B. O. Dodge for the last nine years the Club's Secretary and Treasurer, has resigned his position from the department of botany at Columbia University and gone to the Bureau of Plant Industry at Washington. Dr. Francis W. Pennell of the New York Botanical Garden has been elected Secretary-Treasurer of the Club.

Dr. Carl Skottsberg the director of the new botanical garden at Göteborg, Sweden, who lectured before the Club in the autumn of 1918, *en route* from Chili to Göteborg, writes that, like our own, the winter just past was of exceptional severity. The garden is to have special geographical sections of which that devoted to Eastern Asia will be planted in 1920 and the North American section in 1921.

Dr. Roland M. Harper has recently completed some studies on the resources of southern Alabama, including considerable work on the vegetation. He has gone to central Florida, where he will carry on similar work, which was started in 1915. His address will be Geological Department, Tallahassee, Florida.

The Torrey Botanical Club

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OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

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(1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 46 published in 1919, contained 502 pages of text and 19 full-page plates. Price $4.00 per annum. For Europe, 18 shillings. Dulau & Co., 47 Soho Square, London, are, agents for England.

Of former volumes, only 24–46 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–46 three dollars each.

Single copies (30 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–15 are now completed; No. 1 of Vol. 16 has been issued. The subscription price is fixed at $3.00 per volume in advance; Vol. 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00. Certain numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) The Preliminary Catalogue of Anthophyta and Pteridophyta reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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BY

NORMAN TAYLOR

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NORMAN TAYLOR
Brooklyn Botanic Garden
Brooklyn, N. Y

TORREYA

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May–June, 1920

ADDITIONS TO THE FLORA OF WESTERN OREGON DURING 1919

By James C. Nelson

It has been possible to continue the examination of our flora during the past season along the lines suggested in my previous notes (Torreya **18**: 21–35; ib. 220–226. 1918). It was pointed out at that time (1) that the boundaries established in Piper & Beattie's Flora of the Northwest Coast were very easily crossed by indigenous species of adjacent range; (2) that our climate and soil are so favorable to the introduction and spread of foreign species that a steady increase in our plant-population may be expected from this source. The following notes on the collections of the past season may serve to verify both of these propositions. In the matter of native species, I was able to study three regions which may be regarded as natural avenues of ingress. One of these was the Calapooia Range along the southern boundary of Lane County, which was selected by Piper and Beattie as marking the southern limit of their Flora. I had ventured the assertion (Torreya 18 : 23) that this seemed a very slight barrier to interpose to the northward extension of the Californian flora. But I had not at that time visited the region, and knew nothing of its topography in detail. In June of the present year (1919), I made my headquarters at Cottage Grove, within two hours' walk of the Calapooias, and worked along the range for a total distance of some thirty miles east and west. I found it of very moderate elevation, the highest summit visited reaching only 2,200 feet, and pierced by two main arteries of travel, the Southern Pacific Railway and the Pacific Highway, not to mention many minor roads and innumerable trails. Just where the

[No. 2, Vol. 20, of Torreya, comprising pp. 17–36, was issued 4 June, 1920.]

authors of the Flora meant to draw their boundary-line I was unable to determine; perhaps, like myself, they were misled by the map, on which the Calapooia Range appears as a single well-defined ridge. As a matter of fact, it is a complex of mountains and valleys at least ten miles in breadth, flanked by foothills on both sides, but with a somewhat more abrupt approach on the north than on the south. To draw a botanical boundary-line under such circumstances would be most difficult, for any plant that succeeded in finding its way into the range would have little trouble in advancing into the more open country to the north. There are no summits above snow-line to be crossed, no streams of any considerable width, no barren areas, no zones of continuous cultivation, no appreciable change of climate—in fact, the casual collector would never dream, from any outward indications, that he was approaching anything as momentous as a botanical boundary. It is not surprising therefore that several species were collected during this trip which find no mention in the pages of the Flora of the Northwest Coast.

After this hasty survey of the southern boundary, it seemed in order to visit the eastern one, and try to determine to what extent the Cascades have barred the way to the flora of Eastern Oregon. Here is a real mountain barrier, often rising far above snowline, pierced by few avenues of travel, and with very diverse climatic conditions on the two faces. The point of attack was Mount Jefferson, on the eastern line of Linn County—a precipitous volcanic peak, 10,500 feet in height, and so steep that only a veteran Alpinist can hope to reach the summit. Much of the west slope is too sheer for trees to get more than a precarious foothold, and a large part of the region has in addition been swept by forest-fires, so that an aridity prevails in many places which would not ordinarily be expected on the western side of the Cascades. It was not surprising, in an environment so similar to the semi-arid region of central Oregon, to encounter species which have been thought to belong only to the eastern division of the state.

Our *western* boundary, consisting of the Pacific Ocean, could not be expected to afford an avenue for any introductions except

such as were frankly indebted to human agency for their transportation; but the *northern* boundary of the State, although not the northern boundary of the Flora of the Northwest Coast, seemed worth some study. Along the sand-bars of the Columbia and on its low muddy shores is a surprising aggregation of species that have either been brought down by the river from their inland range, or have found lodgment in some unexplained way after wider wanderings. The number of these unexpected strangers will be evident after a study of the following list.

In addition to these penetrations of the frontier by indigenous species, the influx of foreign forms has been found to continue unabated. Just where they come from it is usually quite impossible to determine; they were not here yesterday, but to-day we find them. and to-morrow, so favorable are our soil and climate, we can be reasonably certain that they will still be here. Not only is this true in the centers of population, but very often our first encounter with these new plants is in some remote country district or along some mountain stream. No species has been included in the following list that was not growing spontaneously and with a good chance of perpetuating itself indefinitely. Every one of these species was collected within the Oregon limits of the Flora of the Northwest Coast, and is understood to be without mention in that work. Specimens of each have been deposited in the Gray Herbarium, and I must again express my indebtedness to Mr. J. Francis Macbride for his unwearying kindness in revising and correcting my attempts at determination, as well as in clearing up many knotty problems of nomenclature and specific limits. Species that are clearly introduced are marked with an asterisk(*). A number of these were originally reported in my list of Linnton ballast-plants (Torreya 17: 151–160). At the time they did not seem sufficiently stable to be worthy of inclusion in a list of established species; but, although the area was occupied by a shipyard during the war, and the vegetation upon it consequently subjected to a very rigorous test (most of the ground being excavated or planked over, covered with piles of material and machinery, and tramped over daily by hundreds of men and horses), I was delighted to find that several species

had survived all these vicissitudes, and were still flourishing on the occasion of my last visit in August, 1919. I feel therefore that they have earned their right to be regarded as permanent members of our flora, and they are included in the following list.

1. *Azolla caroliniana* Willd. In shallow water at the west end of Oswego Lake, Clackamas County. Also reported by Gorman from Oak Grove in the same county.
2. *Equisetum fluviatile* L. var. *polystachyum* (C. Brückn.) A. A. Eaton. With the species in a marsh at the east end of Pamelia Lake, at the southwest base of Mt. Jefferson. Apparently has been found but once before in this country, by Flett at Tacoma, Wash.
3. **Digitaria sanguinalis* (L.) Scop. On site of old stable, Salem.
4. **Setaria glauca* (L). Beauv. In waste ground on river-bank, Salem.
5. **Ammophila arenaria* (L.) Link. In shipyard on old ballast, Linnton, Portland.
6. **Aspris capillaris* (Host.) Hitchc. Beginning to appear in many places, but first collected on a sand-bar in the North Santiam River at N. Santiam Station, Marion County.
7. *Eragrostis caroliniana* (Spreng.) Scribn. On a sand-bar in the Columbia on Hayden Island, opposite Vancouver, Wash. Has been reported from southeastern Oregon, and common in the Middle West.
8. **Bromus brizaeformis* F. & M. In shipyard, Linnton. Very common east of the Cascades.
9. **Agropyron junceum* (L.) Beauv. With the last. A species of northern Europe.
10. **Secale cereale* L. A frequent escape in railroad yards, Lower Albina, Portland.
11. *Scirpus pauciflorus* Lightf. In mountain meadow in Hunt's Cove, three miles south of Mt. Jefferson—altitude 6,000 feet.
12. *Carex brachypoda* Holm. With the last.
13. *Carex ormantha* (Fernald) Mackenzie. With the last.
14. *Allium attenuifolium* Kellogg. Not uncommon in dry soil about Salem.

15. *Salix lasiolepis* Benth. var. *Bigelovii* Bebb. In low ground along Mill Creek, Turner. Det. by Camillo Schneider.
16. *Salix lasiandra* Benth. var. *lancifolia* Anderss. Rather frequent along streams and borders of ponds. Det. by C. Schneider.
17. **Polygonum prolificum* (Small) Robinson. Sandy soil in railroad yards, Lower Albina, Portland.
18. **Polygonum polystachyum* Wall. Dry roadside near State Fair Ground, Salem; also about old barn at Wheatland, Yamhill County. A native of the Himalayas and Afghanistan.
19. **Fagopyrum esculentum* Moench. Along railroad tracks, Silverton.
20. **Roubieva multifida* (L.) Moq. In shipyard, Linnton, and abundant in waste ground at Lower Albina.
21. **Atriplex patula* L. var. *hastata* (L.) Gray. Abundant on rubbish heaps and in waste ground at State Fair Ground, Salem.
22. *Spergularia salsuginea* Fenzl var. *bracteata* Robinson. Mud-flats along the Columbia on Hayden Island.
23. **Lychnis alba* Mill. On sand-bars in North Santiam River, and in grain fields at Salem.
24. **Silene pendula* L. In an abandoned garden, Salem.
25. **Dianthus barbatus* L. Shady roadside near Marion, Marion County.
26. *Thalictrum polycarpum* Wats. Not infrequent in low ground in the Willamette Valley.
27. **Nigella damascena* L. In waste ground and vacant lots, Salem.
28. *Delphinium leucophaeum* Greene. On rocky cliffs about Oswego Lake, and along the Willamette River at Elk Rock. Apparently a distinct species.
29. **Glaucium flavum* Crantz. In ship-yard on old ballast, Linnton.
30. **Lepidium virginicum* L. With the last.
31. **Brassica incana* Tenore. With the last.
32. **Diplotaxis tenuifolia* (L.) DC. With the last; also in railroad yards at Lower Albina.

33. **Roripa sylvestris* (L.) Bess. Dry soil along streets, Salem.
34. *Roripa lyrata* (Nutt.) Greene. Muddy shores of Pamelia Lake, Mt. Jefferson.
35. *Cardamine Lyallii* Wats. About a spring on mountain-side, in Hunt's Cove, Mt. Jefferson region.
36. **Arabis alpina* L. Common in cultivation at Salem, and escaping freely to garden-borders and street-parking.
37. **Reseda lutea* L. In shipyard, Linnton.
38. **Reseda Luteola* L. With the last; also in railroad-yards, Lower Albina.
39. *Cotyledon oregonensis* Wats. On dry rocky slope, three miles south of Mt. Jefferson.
40. *Saxifraga arguta* Don. In boggy soil on mountain-side, Hunt's Cove, Mt. Jefferson region.
41. *Saxifraga saximontana* E. Nels. On wet cliffs, Oswego Lake and Elk Rock.
42. *Saxifraga fragosa* Suksd. Low woods along Mill Creek, Turner.
43. *Potentilla Drummondii* Lehm. Mountain-meadow in Hunt's Cove, Mt. Jefferson region.
44. **Potentilla rivalis* Nutt. On rubbish about city dump, Portland. Reported by Gorman from Columbia Beach.
45. **Rubus illecebrosus* Focke. A Japanese species, stubbornly persisting after cultivation in a garden at Salem, and almost impossible to eradicate.
46. **Cytisus multiflorus* (Ait.) Sweet. Common in cultivation about Portland, and well established in a dry pasture three miles east of Tualatin, Washington County.
47. **Melilotus officinalis* (L.) Lam. Common in waste ground about Portland.
48. **Lotus corniculatus* L. In shipyard, Linnton.
49. **Ononis arvensis* L. With the last.
50. **Lathyrus hirsutus* L. On vacant lots and street-parking, Salem; also reported by Sheldon from Portland.
51. **Lathyrus sphaericus* Retz. In dry soil on neglected street-parking, Salem.
52. **Euphorbia Helioscopia* L. On rocky shore of the Willamette, Lower Albina, Portland.

53. **Tilia europaea* L. Thoroughly established at border of woods by roadside, Gunter, Douglas Co., in the Calapooias.
54. *Sidalcea Nelsoniana* Piper. Not uncommon in dry ground about Salem. This is the "apparently undescribed species" of my list in Torreya (18 : 28. No. 90).
55. **Althaea rosea* Cav. A common escape to vacant lots and waste ground, Salem.
56. **Viola odorata* L. Escaping to cultivated ground about Salem. This is the form with white *single* flowers.
57. *Viola orbiculata* Geyer. Dry woods near timber-line on Mt. Jefferson. Previously collected in this region by Gorman.
58. **Oenothera mollissima* L. In shipyard, Linnton. An Argentinian species.
59. *Sphaerostigma andinum* (Nutt.) Walp. On muddy shore of the Columbia on Hayden Island.
60. *Clarkia rhomboidea* Dougl. Dry woodland on Parrott Mountain, three miles northeast of Newberg.
61. *Lomatium microcarpum* (Howell) C. & R. On a rocky ridge in the Calapooias, two miles northeast of Comstock, Douglas County. Perhaps the first report since its discovery at Roseburg.
62. *Arctostaphylos patula* Greene. Dry slope of Mt. Jefferson, above Pamelia Lake.
63. **Asclepias syriaca* L. On vacant lots and street-parking, Salem.
64. *Phacelia californica* Cham. Dry soil along railroad, Cottage Grove. This is Macbride's forma *vinctens* (Contr. Gray Herb. 49: 37. 1917); but as no such present participle seems to occur in the Latin language, and it was evidently Mr. Macbride's intention to use a form of *vincire*, to bind or twine, it would not seem a violation of the International Rules to substitute the form *vinciens*, and the correction is accordingly proposed.
65. *Phacelia Bolanderi* Gray. Rocky slope along the Pacific Highway in the Calapooias, one mile south of Divide, Lane County.

66. *Phacelia nemoralis* Greene var. *mutabilis* (Greene) Macbr. Very common in dry soil—perhaps the only form of this species in the Willamette Valley.
67. *Cryptantha Hendersonii* (Nels.) Piper. Not infrequent in rocky woods, especially near Portland.
68. **Omphalodes linifolia* (L.) Moench. Beginning to escape to street-parking, Salem.
69. *Verbena prostrata* R. Br. Dry soil along the railroad, in the Calapooias, three miles south of Divide.
70. **Solanum rostratum* Dunal. In railroad yards, Lower Albina.
71. **Solanum sisymbriifolium* Lam. In shipyard, Linnton.
72. *Linaria texana* Scheele. On a rocky ridge in the Calapooias, two miles northeast of Comstock, Douglas County.
73. **Plantago major* L. var. *intermedia* (Gilib.) Dcne. Not infrequent on muddy shores about Salem.
74. **Galium Mollugo* L. Frequent on lawns in Salem.
75. **Centranthus ruber* DC. Often persisting in yards, Salem.
76. **Echinocystis lobata* (Michx.) T. & G. In thickets along Mill Creek, Salem.
77. *Erigeron confinis* Howell. On dry rocky slope of Mt. Jefferson. This seems very close to *E. aequifolius* Hall, a species of the Sierra Nevada, and closer study is needed.
78. **Ambrosia psilostachya* DC. In railroad yards, Lower Albina.
79. *Franseria acanthicarpa* (Hook.) Cov. Sand-bar on Hayden Island.
80. **Xanthium oviforme* Wallr. With the last. A native of the Orient, which has probably been confused in the West with *X. speciosum* Kearn.
81. *Rudbeckia occidentalis* Nutt. Dry soil along roadside in the Calapooias, a half-mile south of Divide. Also reported by Gorman from the Three Sisters.
82. **Matricaria inodora* L. In shipyard, Linnton.
83. **Artemisia vulgaris* L. With the last; and also in railroad yards, Lower Albina.
84. **Artemisia annua* L. In railroad yards, Lower Albina.
85. *Artemisia ludoviciana* Nutt. On sand-bars in the North

Santiam River; and also along the shores of the Columbia near Portland.

86. *Cacaliopsis Nardosmia* Gray. In open woods on the summit of a ridge in the Calapooias, seven miles northwest of Drain, Douglas County.

87. **Carduus nutans* L. In shipyard, Linnton.

88. **Cirsium arvense* (L.) Scop. var. *vestitum* Wimm. & Grab. With the last.

89. **Centaurea Calcitrapa* L. With the last.

90. **Hieracium Pilosella* L. Abundant in a lawn at Salem, threatening to become a formidable pest, as it is most difficult to eradicate.

This list brings the total of species added to the flora of Western Oregon since these studies were begun to 309. As the number listed in the Flora of the Northwest Coast is 1617, it will be observed that the authors of that work failed to mention about sixteen per cent. of the total number of species in their territory. In other words, the student who depended wholly on their manual would fail to determine about every seventh species which he encountered—a margin of possible error much too large to be comfortable.

Whether this state of uncertainty will be relieved by the next manual due to appear in this district—Professor Abrams' Illustrated Flora of the Pacific Coast, the first volume of which is understood to go to press about the first of the year—still remains on the lap of the gods. The Oregon botanists realize that a close personal survey of their territory yet remains to be made; and as the value of "absent treatment" as applied to the preparation of a flora is somewhat open to question, it is within the bounds of possibility that these local supplementary lists may still be not wholly valueless after several more of these "comprehensive" manuals have come and gone!

Salem, Oregon

LENGTH OF DAY INSTEAD OF TEMPERATURE CONTROLS TIME OF FLOWERING AND FRUITING*

For generations scientists have known that sunlight was necessary for normal growth of most kinds of plants, and, although the summer sun might occasionally become too hot, they have understood that it could not cause any injury except perhaps the injury due to burning. A recent discovery by W. W. Garner and H. A. Allard, of the Bureau of Plant Industry, United States Department of Agriculture, shows that, entirely apart from any effect of burning, it is possible for plants to have too much daylight or, in other words, too many hours of daylight in comparison with the number of hours of darkness. Too long a day as well as too short a day will prevent many kinds of plants from ever reaching their stage of flowering and fruiting.

Furthermore, the intensity of the light has very much less significance upon the growth of the plant than has usually been supposed. Greenhouse experiments prove that the flowering and fruiting period of practically any plant can be made to take place at any time of the year by darkening the greenhouse in the morning and evening if the day is too long, or by lengthening the day by artificial light if the day is too short. This new theory of controlling flowering and fruiting of plants undoubtedly will be used by florists and other greenhouse operators. For example, violets bloom only during the comparatively short days of spring; but if violet plants are covered with light-proof boxes at night and not uncovered until the sun is about half an hour high each morning during the summer time, violets can be forced to bloom again in the summer. Spring flowers and spring crops happen to be spring flowers and spring crops because the days at the season of their flowering and fruiting have the proper

* From a recent news bulletin of the U. S. Department of Agriculture. The *Journal* of Agricultural Research recently contained an article of which this is a popular account. The work is perhaps the most significant in recent ecological research. An apparent exception to the theory is the fact that the Lapland Rhododendron, brought from the summit of Mt. Marcy to the Brooklyn Botanic Garden, was kept all winter in the dark and flowered at Brooklyn six weeks before the normal period above the timber line. In this case it flowered only about four weeks after the winter covering was removed.—ED.

number of hours of daylight. Correspondingly, the early summer flowers and crops must have a longer period of daylight. This has been proved as to a large number of plants, and the scientists believe that the principle will hold throughout the higher forms of plant life, and that it is probably applicable to animal life as well.

Reproduction Depends on Day Length

The plant can not attain sexual reproduction, it has been shown, except when it is exposed to a favorable length of day. The requirements, however, differ widely with species and varieties. But a length of day that is unfavorable to reproduction may be favorable to growth. Under that condition, the plant continues its vegetative development profusely and indefinitely without bearing fruit. A length of day may be found that is favorable both to sexual reproduction and vegetative growth. That tends to bring about the "ever-bearing" type of fruiting.

By employing dark chambers to shorten the period of light and artificial lights to extend it, scientists of the Department have shortened or lengthened the life cycle of plants, have made some of them complete two cycles in a single season, have brought others into flower and fruit months in advance of their regular time and, with still others, have greatly delayed and even completely prevented fruiting.

Long series of tests have been made with soy beans, tobacco, wild aster, climbing hempweed, beans, ragweed, radish, carrot, lettuce, hibiscus, cabbage, violets, goldenrod, spinach, cosmos, iris, beggartick, buckwheat, and various other plants.

A test made with Biloxi soy beans will show how the principle works. For the test plants the day was shortened by several hours. That is, they were exposed to the light only from 10 o'clock in the morning till 3 o'clock in the afternoon. They were first placed in the dark house on May 20. Control plants, otherwise treated exactly like the test plants, were left exposed to the light from dawn till dark. The first blossoms appeared on the dark-house plants on June 16. No blossoms appeared until September 4 on the plants that were left in the light all day. But the dark-house plants averaged only 6 or 7 inches high, while

the plants that were left in the light all day grew to an average height of 57 or 58 inches.

These plants required a short day and a long night for flowering and seed-bearing. In tests with other plants, just the opposite was found to be true. The plants that were left in the light all day did not grow luxuriantly, but produced flowers and seed, while those that were kept in the dark part of the day made abundant growth, but produced no seed or else were greatly retarded in producing seed.

Temperature Has Little Influence

Temperature appeared to exert no influence in these tests. The results were the same, even when the temperature was higher in the dark house than on the outside. Another striking illustration of the relative unimportance of temperature is the fact that plants kept in the dark for a part of the day underwent, in midsummer, the changes that in nature come in the fall and have always been attributed to lower temperatures. This, also, was true even when the dark houses registered a higher temperature than that of the outside summer atmosphere.

The results obtained by artificially extending the period of light are just as interesting as those obtained by artificially shortening it. The artificial illumination, in a test with iris, was so arranged as to give 18 hours of continuous light in a greenhouse during the winter. Control plants were kept in a similar greenhouse with no artificial light. The test was begun on October 20, 1919. In the greenhouse where daylight was supplemented with electric light the plants made rapid growth, soon attained normal size and produced blossoms on December 24. The plants in the greenhouse where no artificial light was used, though it was kept at the same temperature, remained practically dormant and showed no tendency to blossom as late as February 12, 1920.

Important Influence on Crop Yields

The influence of this discovery on crop yields is likely to be of no little importance. The length of day is proved to be the

most potent factor in determining the relative proportions between the vegetative and fruiting parts of many crop plants. Indeed, fruiting may be completely suppressed by a day either too long or too short. The advance in agricultural practice which may come through this new discovery will have to be brought about largely by plant breeders and other crop specialists. For instance, it will prove of material significance in the future planning of cropping systems for different regions, especially where consideration of new crops from different latitudes is necessary.

This new principle undoubtedly explains the erratic behavior which has been observed with many crops when they are shifted to different latitudes, and may also clear up the conflicting results of variety tests and field tests conducted with the same crops but in different regions. The experiments have shown, for instance, that ragweed requires for flowering a stimulus that is afforded by the shortening of the days and lengthening of the nights. It does not come into flower until the period of daylight falls below 15 hours. In the latitude of Washington, that comes about July 1. But if ragweed seed should be taken to northern Maine and planted, the plants would not experience a length of day below 15 hours until about August 1. Therefore, they could not come into flower until after August 1 and, though the vegetative growth might be very rank, they could not mature seed before killing frosts intervened. The long days, therefore, make it impossible for ragweed to perpetuate itself in that latitude. On the other hand, plants that get their flowering stimulus from a long day could not perpetuate themselves through seed formation at the equator, where the day never exceeds 12 hours.

Explains Luxuriant Growth in Northern Latitudes

This principle affords the clue to the fact that many plants grow most luxuriantly near the northern limit of their range. The long northern day allows them to attain their maximum growth before the shorter day intervenes to check vegetative growth and start the reproductive process.

It may be found eventually, say the men who worked out the principle, that the animal organism, also, is capable of responding to the stimulus of certain day lengths. They believe that the migration of birds may be an illustration. Direct response to such a stimulus, they say, is more in line with modern teachings of biology than theories which assume that birds migrate as a matter of instinct.

PIN OAK IN NEBRASKA

By Raymond J. Pool

In a handbook of Nebraska trees published in March, 1919, I made the statement that: "Pin oak does not occur naturally in Nebraska, but it occurs in north central Missouri and eastern Kansas, so we may expect it to wander into our state some day via the southeastern corner." The statement is rather interesting in view of the fact that pin oak was discovered in southeastern Nebraska during the summer of 1919.

Early in September, 1919, Mr. Thomas D. Howe, collector for the department of botany in the University of Nebraska, collected specimens from an oak tree growing near Table Rock, Nebraska, and he believed that the tree was pin oak, *Quercus palustris* Du Roi. Mr. Howe brought his specimens to the department of botany where his earlier judgment was confirmed by further study and comparison by several members of the department.

The tree in question is about 20 feet in height with a trunk diameter of about 5 inches, breast high. It is growing in association with red oak at the edge of the natural oak woodlands on the north-facing slope of a low hill about 1½ miles northeast of Table Rock. That town is in Pawnee county, about 35 miles from the extreme southeastern corner of the state, but only about 15 miles from the Kansas-Nebraska state line.

The nearest house is a quarter of a mile from where the tree stands on the edge of the forest where the forest gives way to a cultivated field. It would seem very unlikely that anyone could have planted the acorn in such a place; there would be no

object whatever in starting a pin oak in that particular spot. There are no planted pin oaks in the vicinity. All of our evidence clearly indicates that the tree discovered by Mr. Howe is native. As such this tree is doubtless the most westerly individual of the pin oak yet discovered growing under natural conditions, and to all appearance native. This adds another species to the list of native trees of Nebraska, a list which now contains about sixty-five species.

The specimens which Mr. Howe collected are now deposited in the herbarium of the Botanical Survey of Nebraska.

It may be of interest to the readers of this journal, in connection with the above note, to have a list of all of the native oaks of Nebraska. The list follows:

Bur oak, *Quercus macrocarpa* Michx.
Red oak, *Quercus rubra* L.
Black oak, *Quercus velutina* Lam.
Scarlet oak, *Quercus coccinea* Moench.
Black jack oak, *Quercus marilandica* Moench.
White oak, *Quercus alba* L.
Swamp white oak, *Quercus bicolor* Willd.
Yellow oak, *Quercus acuminata* (Michx.) Sarg.
Low yellow oak, *Quercus prinoides* Willd.
Laurel oak, *Quercus imbricaria* Michx.
Pin oak, *Quercus palustris* Du Roi

The bur oak is by far the most abundant and most widely spread species of the genus in this state. The species is found very commonly in the drier sites in the gallery woods along the streams quite generally over the eastern half of the state. The commonest oak associate of the bur oak is the red oak, although the latter is not nearly so widely distributed or as abundant as the bur oak. On the dry exposed bluffs the bur oak is often dwarfed to such a degree as to form a chaparral-like association, often called "scrub oak."

Except for bur oak and red oak our native oaks are very nearly all restricted in their distribution to the area south of the Platte river along the bluffs and ravines of the Missouri river and extending westward along the tributaries of the latter stream for a

scant twenty to forty miles. These represent the western-most extensions of species, all of which are much more abundant farther eastward or southward. White oak, black jack oak, laurel oak and pin oak are very rare within that area. Yellow oak, low yellow oak and swamp white oak are relatively abundant in a very few localities.

The ecological relations controlling these distributional phenomena are quite well known. The major ecological factors indicate a very decided advancement toward an increased xerophytism extending westward and northward from the southeastern corner of the state.

LINCOLN, NEBRASKA,
December, 1919.

SHORTER NOTES

THE PAPER MULBERRY (*Broussonetia*) AN "ARTILLERY PLANT."—A number of the Nettle Family (*Urticaceae*) are known be eject the pollen forcibly, one of these plants (*Pilea serpyllifolia* Wedd., or *P. muscosa* Lindl.) being often cultivated under the name "artillery plant" because of the curious explosive opening of the staminate flowers. Particularly when the plants are placed in sunlight, after having been sprinkled, the pollen is forcibly thrown out in a smoky cloud, reminding one of the bursting of miniature shells or bombs.

I was much interested last spring to find that the Paper Mulberry (*Broussonetia papyrifera* Vent.) has the same habit of throwing its pollen as has the *Pilea*. It is interesting to recall, also, that these plants are in closely related families, the *Moraceae* and *Urticaceae* having much in common. The 21st of May, 1919, in Philadelphia was a warm showery day, the frequent thunderstorms alternating with bright hot sunshine, and the paper mulberries, dripping after a shower, presented a curious spectacle in the bright sunlight. There was a continuous succession of puffs of smoky pollen from various parts of the tree, apparently all the flowers in a catkin exploding at once and filling the air with yellow "smoke" to a radius of about an inch in all directions, after which the pollen drifted lazily away on the gentle breeze.

Presumably here, as in *Pilea* (see Jost, Plant Physiology, English Edit., 1907, p. 425), osmotic pressure tears an anther loose from the base of the stamen, the filament straightening with sufficient force to throw out the pollen. The staminate flowers are in a rather compact catkin and it is likely that the jar of one stamen straightening and bursting is enough to set off the other flowers; at any rate, examination of a catkin after an explosion shows generally that all of the flowers have been sprung and the pollen thrown out.

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REVIEWS

Knowlton's Mesozoic and Cenozoic Plants of America*

Those who have had occasion to deal with American Cretaceous or Tertiary plants have long used and valued Dr. Knowlton's Catalogue published in 1898, which brought together the scattered records in the most convenient form. The new Catalogue, a work of 815 pages, enumerates all the Mesozoic and Cenozoic species, including, as Dr. Knowlton informs me, no less than 4,789 accepted forms. The fossil plants of Greenland and Mexico are excluded, but those of Alaska are fully cited. In its form and arrangement the new Catalogue resembles the old, but it differs in having a series of extremely useful appendices. The first of these gives the classification of all the genera in orders, families, etc.; the second an index of genera and families in the classification; the third enumerates the plants of each formation, from the Triassic to the Pleistocene. The amount of labor represented is enormous, but the saving to others is much greater. My annotated copy of the old list, and my imperfect attempts to cover the ground represented by the appendices, look rather pathetic by the side of this vastly more complete and satisfactory work. We can only hope that with this new aid the very small band of American paleobotanists will be

* Knowlton, F. H., A Catalogue of the Mesozoic and Cenozoic Plants of North America, U. S. Geological Survey, Bulletin 696, 1919 (published early in 1920; received at Boulder, Feb. 18).

increased, so that eventually the whole subject will be adequately revised. This, however, will not occur until there are better publishing facilities, including means of presenting adequate illustrations. Thus, for example, under existing conditions it is futile to attempt to revise the Cretaceous plant remains accumulating in the University of Colorado, since no provision exists for the publication of a report. The Rocky Mountain Cretaceous strata are at present furnishing great quantities of oil and coal, and the volume of wealth produced is almost incredible. Yet no provision is made for a complete and systematic survey of the Cretaceous rocks and their fossils, and the prevailing ignorance leads to great waste and no little fraud, for all of which the public eventually has to pay. Scientific men, who should be conducting fundamental researches, are many of them induced to spend their time working for private companies, so that the general situation tends to get worse rather than better. The proper remedy would be to tax the oil and coal industries for the purpose of securing adequate funds for a continuous scientific survey of all the strata concerned and problems involved. Then young men and women of ability might be induced to devote their lives to research, knowing that they would have fair pay, opportunities for getting the work done, and would be rendering important services to their country. We may still believe that there are many who, under such conditions, would resist the temptation of the money bags.

It must not be supposed that Dr. Knowlton's Catalogue is of interest only to students of fossils. It should be in the possession of every botanist who cares anything about the wider aspects of his science. The lists of species by strata and localities will be especially instructive, and will tend to correct the impression produced by the combined list (as if of a single flora) given in Harshberger's great work on the distribution of American plants. It will be noticed that nearly all the genera of woody plants well represented today in North America also abounded during Tertiary times. The climate during at least the greater part of Tertiary time was evidently warmer than now, but aside from this, the genera were more widespread apparently independently

of climatic influences. Thus the tree flora of Florissant during the Miocene was rich in types now lacking in Colorado. Some of these, as *Ficus*, *Sequoia* and *Magnolia*, could not now exist in this region. Others, however, apparently could live well enough, and do so in cultivation. We thus see that the present flora is to be explained partly by present conditions, but largely also by those of the past, which led to the regional extermination of certain types. The ecologist who concerns himself only with the present is thus like a sociologist who should refuse to study history.

The question has often been raised, how far can we trust the determinations of the paleobotanists? Undoubtedly many of the generic references are erroneous; even Lesquereux, who was not only a great paleobotanist, but also a specialist in living mosses, described a fragment of a fossil conifer as a moss. Nevertheless, very much may be learned from the fossils, and there can be little doubt that on the whole things are pretty much what they seem to be. I believe that a closer study of the Tertiary fossils will throw much light on the origin of elements in the modern floras of North and South America, especially when the results of Dr. Berry's recent trip to the Andes are made available. Thus, it is very interesting to find abundant remains of apparently quite genuine Cunoniaceae (*Weinmannia*) and Proteaceae in the Rocky mountain Miocene. Whence came these southern types? I believe via Asia, rather than by way of South America. So also with *Porana*, an old-world type fossil at Florissant, but represented still by a stranded relic south of the Mexican boundary. So also with *Ailanthus*, *Libocedrus*, etc. Take up the genuinely neotropical flora, that which certainly originated in South America, and note the *absence* of innumerable striking types in our fossil floras. A good example is *Cecropia*, which has some 30 or 40 neotropical species to-day, and would be easily recognized.

Another problem is that of the herbaceous plants. A well-known naturalist wrote me the other day, discussing a problem of animal distribution on the supposition that the grass-like plants first became abundant and well developed in the Miocene.

It is certain that they were then much as they are to-day, with a very long history behind them. The very meager catalogue of monocotyledonous plants in Dr. Knowlton's work should convince any one that no dependence can be placed on the apparent absence of these organisms in particular beds. It is the same with the higher herbaceous plants. Only two genera of Compositæ are listed, both from the Florissant Miocene. One of these is thought by Knowlton to be erroneously identified, and although I was responsible for the determination, I now believe he is right. There are no Campanulales at all except at Florissant. Scrophulariaceæ are represented by a lone Florissant species. Who will maintain that these families did not abound during Tertiary time? Their present diversity and abundance prove that it must have been so. Thus the *absence* of herbaceous fossils proves nothing, though we can reason about the absence of trees which shed their leaves in abundance. Undoubtedly, more minute and critical studies will reveal a wealth of herbaceous fossils, at least as represented by flowers, fruits and seeds. I have many such from Florissant, but have set them aside hoping to make accurate generic determinations. Such remains as these strain one's knowledge of botany to the breaking point, but some day they will be deciphered. In a work of such scope, there will always be some errors and omissions, but in this case they seem to be astonishingly few. I found three species omitted, all involving genera not in the list. These are *Firmianites aterrimus* Ckll.,* *Melica primæva* C. T. & Bierne B. Brues,† and *Xantholithes propheticus* Ward.‡ Dr. Knowlton writes me that *Coniospermites* should be *Conospermites*. *Hicoria antiquora* should be *antiquorum* (a genitive plural). *Carpolithes emarginatus* Perkins, from Vermont, is preoccupied by *C. emarginatus* Goepp. (*Cardiocarpum emarginatum* Goepp. & Berg.), and may be called *C. perkinsi* n.n. There are a few errors in the classification; thus *Thrinax* has somehow got into Araceae, and *Hedera* into Vitaceae.

* Amer. Journ. Science, Nov., 1909, p. 447. (Eocene, Green R., Wyo.)

† Bull. Wisc. Nat. Hist. Soc., Oct., 1908 (received April, 1909), p. 171. (Miocene, Florissant, Colo.)

‡ Glimpses of the Cosmos, IV (1915), p. 150. (Laramie, Montana.)

In Journ. Washington Acad. Sciences, VI: 109 (1916) I described what purported to be a lower Cretaceous Flora in Colorado. The only species I definitely identified was *Matonidium althausii*, a well-known Lower Cretaceous fern. Some additional evidence came to light, and in view of the apparent complications it was thought well to refer the material to Dr. Berry, who published a very valuable article in Bull. Torrey Bot. Club, *46*: 285. Berry concludes that the *Matonidium* is a distinct species, which he names *M. americanum*. With this decision I have no quarrel, but I call attention to the subject to illustrate an unfortunate tendency in paleontology to convert suggestions into positive statements in quotations. Berry states that my plants came from "the supposed McElmo," but I said the deposit was "above the McElmo." A fossil which Berry (no doubt correctly) considers to represent the apical part of a *Matonidium* stipe, I said closely resembled *Cycadospadix*. Berry says twice that I "referred" it to *Cycadospadix*. Knowlton, in his list on p. 732, cites from my paper without any query *Equisetum burchardti* and *Sapindopsis variabilis*, but in the main list a query is given with the latter. I said, "stems . . . may well represent the species *Equisetum burchardti*, but the sheaths are unfortunately wanting," and "leaves . . . may well belong to" *Sapindopsis variabilis*, "although the lateral veins appear to form a more acute angle with the midrib than in that species as figured by Berry." Berry thinks both suggested identifications are wrong, so my cautious language was justified. In nearly all paleobotanical work there is necessarily a considerable margin of error, so that when hesitation or doubt appears it should never be converted without investigation into apparent certainty.

T. D. A. Cockerell

Brown's "Forest Products"*

Botany is the foundation of all sciences dealing with plants. Agriculture and forestry are but applied botany. Brown's "Forest Products" will interest botanists and all those who like

* Brown, Nelson C., "Forest Products, Their Manufacture and Use," xix + 471 pages, frontispiece and 120 figures. John Wiley and Sons, New York, 1919. Net $3.75.

to know where the articles they use come from and how they are made. To foresters this book will be essential because effective forest management requires knowledge of the ultimate forest product, and of how that product is worked up and used.

Trees are among the plants most useful to man. Yet how many botanists know the principal uses of trees, aside from lumber? How many realize that the wood of the chestnut (*Castanea dentata*) is used not only for lumber, railroad ties, and "snake" fences such as Lincoln made in his youth, but produces more than two thirds of the tannic acid products made in the United States?

Brown gives clear and readable accounts of the history, process of manufacture and uses of the principal forest products aside from lumber. In the chapter under "Wood Pulp and Paper" he states that the Chinese, and not the Egyptians, as we had supposed, must be credited with the first manufacture of paper. About eighty to eighty-five per cent of all the paper used in this country is now made from wood, whereas before the middle of the nineteenth century paper was made entirely from other vegetable fibers. The increase in the quantity of wood used for paper has been enormous, over three hundred per cent between 1900 and 1919. The supply of the most desirable wood, spruce, is diminishing so rapidly that other woods are being studied as substitutes, and paper mills are being forced to move out of the country. Brown gives in detail the various processes of making paper.

Of special interest, particularly to foresters, is the information on sources of supply with relation to the present and future forest resources of the country. Naval stores (turpentine and rosin) are doomed to virtual disappearance in a short while owing to the ruthless destruction by lumbering and fire of the longleaf pine forests from which these important materials are derived.

Each product is covered in an interesting and thorough manner. These products are: Wood pulp and paper, tanning materials, veneers, slack cooperage (barrels not for liquids), tight cooperage (barrels to hold liquids), naval stores, hardwood distillation (produces charcoal, acetate of lime, wood alcohol and

other materials), softwood distillation, charcoal, boxes, cross ties, poles and piling, posts, mine timbers, fuelwood, shingles, maple syrup and sugar, rubber, dye woods and materials, excelsior, and cork. Numerous well-selected illustrations and an index add to the attractiveness and usefulness of the book.

BARRINGTON MOORE

PROCEEDINGS OF THE CLUB

NOVEMBER 29, 1919

The meeting was held in the Morphological Laboratory of the New York Botanical Garden at 3.30 P.M. Dr. Marshall A. Howe presided. There were eighteen persons present. The minutes of the previous meetings were read and approved. Mrs. Helen S. Harper, 417 Riverside Drive, and Mr. H. E. Thomas, graduate student, Columbia University, were nominated for membership.

Dr. Howe reported for the editorial board regarding the proposition to publish the Torrey-Schweinitz letters as a memoir of the Club, stating that suitable financial arrangements were being made and the publication of this memoir was assured.

The treasurer announced a contribution of $100 from Dr. J. H. Barnhart to the Underwood Fund.

Dr. Levine spoke of business connected with the *Bulletin* and moved to authorize the chairman to appoint a committee to investigate the various activities of the Club with special regard to retrenchment along certain lines with a view to improving the *Bulletin*. The chairman appointed Professor Harper, Dr. Britton, Dr. Dodge, Dr. Levine, Mr. Taylor, and Professors Hazen and Broadhurst members of this committee.

The secretary announced the death of Mrs. R. McM. Colfelt, who has in the past generously contributed to the support of TORREYA.

The scientific program was then in order. Dr. A. B. Stout spoke on "Notes on Forced Bulbs." "Dr. Stout made a report of observations on the behavior of bulbous plants which have been forced. In the winter of 1916–1917 about 100 bulbs of *Narcissus*

Fazetta were grown in pots and brought into bloom in a greenhouse. In the two seasons of growth since then these plants have produced no flowers. They have, however, made a vigorous and healthy vegetative growth showing clearly that they are not 'run down' plants. Examination of the bulbs shows that there is no blasting due to death of terminal growing points. Further studies will be made to determine if forcing induces a more or less permanent vegetative growth or whether a new bulb of this species naturally requires several years of vegetative growth before a flower stalk is produced. Wild plants of this species obtained from Japan and which have been grown at the New York Botanical Garden for two years have failed to produce flowers. Living plants of the various cultures were exhibited."

Dr. W. A. Murrill gave a paper on "Collecting Fungi near Washington," an abstract of which follows:

"The first two weeks in October were spent in the vicinity of Washington, with excursions to Falls Church, Fairfax Court House, Great Falls, and Mount Vernon in Virginia; and to Baltimore, Reisterstown, and Easton in Maryland. Dr. Howard A. Kelly collected with me one afternoon near Falls Church, securing several specimens of fleshy fungi which he took home and had photographed or painted.

"I went with a party of friends over some of the golf links in the suburbs of Washington and found the common field mushroom, the field puffball, the fairy ring mushroom, and a peculiar large form of *Collybia radicata* which grew only under maple trees. All of these were eaten and enjoyed.

"*Clitocybe illudens* was abundant in oak woods, particularly fine clusters being observed west of Falls Church and near the boat landing at Mount Vernon.

"The journey to Easton, located on the eastern shore of Maryland over eighty miles from Washington, was especially interesting because Miss Mary E. Banning, a pioneer mycologist of Maryland was born in Talbot County. Dr. Kelly is preparing an account of her life and work. Her book of manuscript and drawings is at Albany having been donated by her to the State Museum about thirty years ago. A list of the species she col-

lected, comprising fourteen that were new, was published by Dr. Peck in his 44th annual report.

"A day and night were spent at the home of Dr. Kelly in Baltimore, where Mr. L. C. C. Krieger, a botanical artist of great ability, is busily engaged in preparing illustrations of the fleshy fungi."

Adjournment followed.

B. O. Dodge,
Secretary

December 9, 1919

The meeting was held at the American Museum of Natural History at 8.15 P.M. President Richards presided. There were 35 persons present.

The usual business was dispensed with. The Scientific program consisted of an illustrated lecture on "The Uses of Fungi and Bacteria in Industry" by Dr. E. W. Olive, Brooklyn Botanical Garden. A discussion followed the lecture, after which the meeting adjourned.

B. O. Dodge,
Secretary

January 13, 1920

The annual meeting of the club was held at the American Museum of Natural History at 8.15 p.m. President Richards presided. There were fifteen persons present.

The minutes of the meetings held November 29 and December 9 were approved.

Mr. Alexander Gershoy, Assistant in Botany, Columbia University, was nominated for membership.

A letter of resignation from Rev. L. H. Lighthipe was read and accepted. In recognition of his thirty-four years of faithful service in the Club, it was voted to transfer his name to the list of corresponding members.

Professor R. A. Harper, chairman of the Committee on Retrenchment, read the following report prepared by Professor T. E. Hazen, secretary of the committee. (See report appended.)

The recommendations of the committee were adopted with the additional provision that the committee be continued as a Committee on New Members.

A letter from The New Era Printing Company containing a schedule of new prices for the publication of the *Bulletin* was read by the Treasurer.

Annual Reports of the officers were then in order.

The Secretary reported that fourteen regular meetings and one special meeting had been held during the year at which the combined attendance was 414. Six illustrated lectures were given, at which the combined attendance was 211. Fifteen new members were elected during the year, six resignations had been accepted, and seven members had been dropped from the mailing list for non-payment of dues. This report was accepted and placed on file. The treasurer's report was read and referred to an auditing committee, to which the chairman appointed Dr. Barnhart and Dr. Howe.

The report of the editor, Professor A. W. Evans, was read by Dr. Howe. This report showed that the Bulletin for 1919 contained 500 pages, 19 plates and 46 text figures. The articles published embraced the following subjects: Ecology and Plant Geography, 2; Morphology and Taxonomy of Algae, 2; Fungi, 4; Bryophytes, 4; Vascular Plants, 8; Paleobotany, 1; Pathology, 1; Physiology, 2; Taxonomy of Vascular Plants, 8; total, 33. The report was accepted and placed on file.

Mr. Norman Taylor, editor of TORREYA, Dr. M. A. Howe, delegate to the council of the New York Academy of Sciences, Dr. M. Levine, business manager of advertisements and circulation, gave brief reports.

Professor H. M. Richards in his report as president of the Club commented on the various activities of the Club and made several constructive suggestions regarding the possibilities of securing a larger membership and a more extensive financial support.

Professor R. A. Harper, chairman of the Finance Committee, gave a brief report on the financial standing of the Club.

Dr. F. W. Pennell, chairman of the Field Committee, read a report, which was accepted and placed on file.

Dr. F. J. Seaver reported for the Program Committee, and Dr. Howe announced that Professor Setchell had consented to lecture before the Club in the near future.

Mr. Alexander Gershoy was then elected to membership.

The election of officers resulted as follows:

President, H. M. Richards.

Vice-Presidents, John Hendley Barnhart,
C. Stuart Gager.

Secretary and Treasurer, Bernard O. Dodge.

Editor, Alex. W. Evans.

Associate Editors,

Jean Broadhurst,
J. Arthur Harris,
Marshall A. Howe,
Michael Levine,
Arlow B. Stout,
George E. Nichols,
Norman Taylor.

Delegate to the Council of the New York Academy of Sciences, J. H. Barnhart.

Dr. M. Levine was reëlected Business Editor of Advertisements and Circulation.

The president appointed the following standing committees for 1920:

Finance: Prof. R. A. Harper, chairman, Dr. J. H. Barnhart, Miss C. C. Haynes and Mr. H. B. Douglas.

Buget: Dr. J. H. Barnhart, chairman, Prof. R. A. Harper, Dr. N. L. Britton, Prof. A. W. Evans, Dr. M. A. Howe and Prof. H. H. Rusby.

Field: Dr. F. W. Pennell, chairman, Mrs. L. M. Keeler, Mr. G. T. Hastings, Dr. F. J. Seaver, Mr. Norman Taylor, Dr. Michael Levine and Mr. Percy Wilson.

Program: Mrs. E. G. Britton, chairman, Dr. Jean Broadhurst, Dr. Alfred Gundersen and Dr. F. Seaver,

Membership: Dr. J. K. Small, chairman, Dr. T. E. Hazen and Dr. E. W. Olive.

The meeting adjourned at 10 P.M.

B. O. Dodge,
Secretary.

January 28, 1920

A meeting of the Club was held at The New York Botanical Garden at 3.30 P.M. President Richards presided. There were about twenty persons present.

The minutes of the annual meeting held January 13 were read and adopted.

Dr. Howe reported that the Auditing Committee had examined the books of Dr. B. O. Dodge, Treasurer, and found them to be correct.

Dr. B. O. Dodge, for the past nine years secretary and treasurer of the Club, because of his entrance upon scientific work in Washington, D. C., tendered his resignation from both offices. This was reluctantly accepted. The President appointed a committee of five, Drs. Harper, Howe, Barnhart, Rusby, and Richards, the last *ex-officio*, to consider the problem of the handling of the duties of these offices and to select a successor or successors. Awaiting the result of their action, Dr. F. W. Pennell was appointed temporary secretary and treasurer.

Mr. William C. Ferguson, Hempstead, L. I., was nominated and elected to membership.

The resignation of Dr. T. W. J. Burgess was accepted. That of Dr. O. E. White was referred to the Membership Committee.

The scientific program consisted of a joint discussion by Drs. Britton and Small on "Recent Explorations in Southern Florida."

Dr. Small gave an outline of the expedition of Dr. and Mrs. Britton and himself during late November and December of 1919 to southern Florida, telling of work around Miami and in the Everglades, and showing an extensive collection of remarkable plants seen. Among these were several species considered new to science, a *Monotropa* with ochroleucous flowers, an *Opuntia* and a *Houstonia*.

Dr. Britton spoke of his interest in comparing the flora of southern Florida with that familiar to him in the West Indies, especially in the Bahamas. Interesting evidence in the discovery of a considerable and deep limestone cave now sunk below sea-level but yet containing large stalagmites and stalactites, was discovered, showing the recent subsidence of the Everglade district.

Photographs were shown depicting a remarkably complete natural graft of the pigeon-plum.

Another purpose of the trip—that in which Mrs. Britton was particularly interested—was the collection of the lichen-flora.

The meeting adjourned.

FRANCIS W. PENNELL,
Secretary.

FEBRUARY 10, 1920

The first meeting in February was held at the American Museum of Natural History.

President Richards called the meeting to order at 8.30 P.M. There were 28 persons present.

No business was transacted.

Dr. F. W. Pennell gave an illustrated lecture on "Through the Andes of Colombia."

A brief account was given of the speaker's eight months' sojourn in Colombia in 1917–18, of the extent of exploration undertaken and of the collections made. Each of the three cordilleras of the Andes was ascended from the tropical lowland to the paramo above timber-line. Emphasis was laid upon the sharp delimitation of altitudinal zones of vegetation, and the views shown were largely of species characteristic of each.

FRANCIS W. PENNELL,
Secretary.

The Torrey Botanical Club

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their papers appear, will kindly notify the editor when returning proof.

Reprints should be ordered, when galley proof is returned to the editor. The New Era Printing Co., 41 North Queen Street, Lancaster, Pa., have furnished the following rates:

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OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

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(1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 46 published in 1919, contained 502 pages of text and 19 full-page plates. Price $4.00 per annum. For Europe, 18 shillings. Dulau & Co., 47 Soho Square, London, are, agents for England.

Of former volumes, only 24–46 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–46 three dollars each.

Single copies (30 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–15 are now completed; No. 1 of Vol. 16 has been issued. The subscription price is fixed at $3.00 per volume in advance; Vol. 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00. Certain numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

DR. FRANCIS W. PENNELL

2764 Creston Avenue

New York City

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EDITED FOR

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BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873.

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Matter for publication, and books and papers for review, should be addressed to

Norman Taylor
Brooklyn Botanic Garden
Brooklyn, N. Y

TORREYA

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July–August, 1920

SOUTHERN LOUISIANA FROM THE CAR-WINDOW

By Roland M. Harper

Louisiana is one of the two states in the Union that is all coastal plain (Florida being the other). The southern half of the state, although essentially flat and hardly anywhere more than 150 feet above sea-level, has considerable diversity of soil, which is reflected in the vegetation as well as in the population and agricultural features. The agricultural regions of the state were well mapped and described by Dr. E. W. Hilgard in the fifth volume of the Tenth Census, 1884, and the same divisions with slight modifications were used in a report on forest conditions in Louisiana by J. H. Foster (U. S. Forest Service Bull. 114. 1912*), and in a colored "Phytogeographic map of Louisiana," on a scale of about 18 miles to the inch, which has been issued in several editions in recent years by the State Department of Agriculture and Immigration. Additional geographical details can be found in the soil surveys of several parishes and similar areas published by the U. S. Department of Agriculture, and in Water Supply and Irrigation Paper 101 of the U. S. Geological Survey, on the underground waters of southern Louisiana, by G. D. Harris and others (1904), which contains among other things a map showing the distribution of forests, prairies and marshes in the neighborhood of Lake Charles.

Existing descriptions of the vegetation of southern Louisiana are not very numerous or voluminous. There are of course a few local lists of plants, and monographic works that cite Louis-

* Reviewed, with a reduced copy of the map, in Geog. Review 2: 475–476. Dec. 1916.

[No. 3, Vol. 20, of Torreya, comprising pp. 37–65, was issued 18 July 1920.]

iana specimens, but those are of little interest to the plant sociologist. The vegetation of the several regions of the state was sketched by Hilgard in the census report above mentioned and in one or two preliminary papers that preceded it. Nearly fifty years ago Prof. A. Featherman of the Louisiana State University published two or three official reports on botanical surveys in Louisiana, and that for 1781 contains an interesting description of the prairies in the southern part of the state.

Prof. S. M. Tracy, in Bulletin 15 of the Division of Agrostology of the U. S. Department of Agriculture, 1898 (pp. 10–11), published some notes on prairie grasses of southern Louisiana, with a list of about 19 species, including several weeds. Andrew Allison, in a paper on the birds of West Baton Rouge Parish, in the Auk (**21**: 472–483) for October, 1904, devoted about two pages to vegetation, giving technical names of several of the most characteristic plants. In the same magazine for January, 1906, the same author and two others sketched the geography of the whole state, with a regional map patterned after Hilgard's, and a few notes on vegetation. In Torreya (**6**: 201–203) for October, 1906, I described the vegetation of some swamps near New Orleans as it appeared in midwinter.

Prof. R. S. Cocks, in Bulletin 7 of the Gulf Biologic Station at Cameron, La., published by the State Board of Agriculture and Immigration in 1907, entitled The Flora of the Gulf Biologic Station, devoted about two pages (out of 42) to classifying the plants in the vicinity of the station by habitat, and more than six pages to the flora of the prairies west of Lafayette. Two other papers by the same author, namely, Grasses of Louisiana (Bull. 10, Gulf Biol. Sta., 1908), and Leguminosae of Louisiana (Bull. 1, La. Nat. Hist. Surv., 1910), have assisted me in identifying the plants seen on the trips described below. Another interesting contribution by Prof. Cocks, dealing with a part of southern Louisiana that I have not seen, is the first of a projected series of "Notes on the Flora of Louisiana," in the Plant World (**17**: 186–191) for June, 1914, which describes the fertile loess hills north of Baton Rouge from a floristic standpoint.

My first opportunity to see any part of Louisiana west of New

Orleans came in July, 1915, when on the way from Florida to California. Leaving New Orleans shortly before midnight of the thirteenth on the main line of the Southern Pacific system (which operates in Louisiana under the aliases of Morgan's Louisiana & Texas R. R., and Louisiana Western), I traveled in a day coach so as to be able to begin taking notes as soon as there was light enough, although that deprived me of any protection from mosquitoes (for it would hardly be worth while to put screens on a car that runs all the way from New Orleans to Los Angeles and is exposed to mosquitoes only about one tenth of the distance). Daybreak (about 4:30 a.m.) on the 14th found me at Lafayette, 145 miles from New Orleans and just west of the alluvial bottoms of the Mississippi delta. The mosquitoes which had made sleep impossible during the night soon disappeared, and as the locomotive used oil for fuel there was nothing to interfere with botanical observations except the speed of the train and my unfamiliarity with some of the plants. Lake Charles, the metropolis of southwestern Louisiana, was passed a little before 7 o'clock, and the Sabine River at the western border of the state about 7:45.

A little over three years later, when on the way to Texas on an errand for the U. S. Bureau of Plant Industry, I crossed Louisiana by a different route, a little farther north. On the afternoon of August 19, 1918, I went from New Orleans to Baton Rouge by the Yazoo & Mississippi Valley R. R., and on the 20th from Baton Rouge westward to the Sabine River and beyond by the New Orleans, Texas & Mexico Ry. (Gulf Coast Lines, formerly a part of the Frisco System), which uses the Y. & M. V. tracks southeast of Baton Rouge and the Kansas City Southern from DeQuincy, La., to Beaumont, Tex., and burn oil like the Southern Pacific and several other southwestern railroads. The two trips together took me through four or five different kinds of country, whose vegetation will be sketched below.

The flood-plain and delta of the Mississippi River have generally been mapped as a unit in Louisiana, except for the separation of the treeless marshes near the coast from the originally densely wooded portion farther inland. There are some sig-

nificant differences, however, between the alluvial lands at the northern edge of the state and those in the latitude of New Orleans. The soil of extreme northeastern Louisiana is hardly surpassed in productiveness anywhere in the world; but there is a progressive decrease in fertility going downstream from there, for two different—but not wholly independent—reasons. First, on approaching the mouth of the river the seasonal fluctuation of the water diminishes, and with it the opportunities of the soil for aëration;* and second, because of the pronounced increase of late summer rainfall toward the Gulf coast, the soils in that direction must be more thoroughly leached.† The variations in soil fertility are brought out very well by census statistics on the use of commercial fertilizers.‡ In 1909 the farmers in the alluvial parishes above Baton Rouge spent only 7 cents for fertilizers for every acre of improved land in 1910, those between Baton Rouge and New Orleans $1.23, and those below New Orleans $2.22.

In northern Louisiana the alluvial lands are largely devoted to cotton, while about Baton Rouge sugar-cane becomes the leading crop, and that gradually gives way to rice below New Orleans. A northeast-southwest line drawn across the delta a little above Baton Rouge separates the cotton and sugar-cane regions pretty well, and the difference is reflected in the vegetation, as will be shown farther on.

The Sugar-cane Region

From New Orleans to Baton Rouge (88 miles) and about ten miles west of the latter place, or about to the boundary between the parishes of West Baton Rouge and Pointe Coupee, I was in the sugar-cane region, where vast fields of cane, hiding all but the roofs of the one-story houses, are the most conspicuous feature of the late summer landscape. Corn and rice rank next to cane in acreage, the former often planted with velvet beans or sugar-cane in alternate rows. Rice was being threshed at the time I passed by, and the piles of chaff were often burned to get

* See Torreya 11: 223. 1911.

† See Science II. 48: 208–211. Aug. 30, 1918.

‡ See Science II. 42: 500–503. Oct. 8, 1915.

rid of them. The houses are mostly aggregated in villages, each village with its sugar-mill. Water for domestic purposes is generally taken from cisterns, as in numerous other fertile regions. The forests are reduced to scattered remnants, mostly along streams. The commonest trees seem to be *Salix nigra* (?), *Populus deltoides, Liquidambar, Platanus, Taxodium distichum, Ulmus americana,* and *Celtis* sp., in the order named. There are hardly any erect shrubs, but three woody vines, *Rhus radicans, Tecoma radicans,* and *Ampelopsis arborea* are fairly common. The epiphyte *Tillandsia usneoides* is the only native herb that is at all conspicuous, the other herbs noted being mostly weeds, such as *Ambrosia trifida* and *Paspalum Vaseyanum.*

The Cotton Region

From about Westover to Opelousas, 49 miles, on the Gulf Coast Lines, the country is still flat and alluvial, but about half wooded, with less cane and more cotton than had been seen the day before. Several sawmills were passed, and the forests had been damaged a good deal by lumbering, draining, grazing, etc. The commonest plants in that distance, which is through the cotton region of the Mississippi bottoms, seem to be as follows:

Trees

Liquidambar Styraciflua
Salix nigra (?)*
Taxodium distichum
Acer Drummondii (?)
Celtis sp.
Populus deltoides
Quercus texana (?)
Gleditsia triacanthos
Fraxinus americana (?)
Quercus nigra
Hicoria aquatica (?)
Acer Negundo

Shrubs and Vines

Ampelopsis arborea
Rhus radicans
Sabal glabra
Cephalanthus occidentalis
Tecoma radicans
Brunnichia cirrhosa

* If this is *S. nigra* it grows taller and straighter here than it usually does elsewhere.

Herbs (all weeds)

Chamaecrista robusta (?)	*Verbena angustifolia* (?)
Helenium tenuifolium	*Piaropus crassipes*
Croton capitatus	

The Prairies

Dr. Hilgard distinguished three kinds of prairie in southern Louisiana, all contiguous, namely, brown loam on the northeast, gray silt on the west, and black calcareous on the south, next to the coast marshes. I crossed all three, but on account of the relatively small extent of natural vegetation remaining and the inherent difficulty of identifying herbs from a fast train, on a route traversed only once, I will not attempt to separate them at this time. On the more southerly route the ground-water level is pretty close to the surface, and the railroad is built on a low embankment most of the way, while on the other route, 15 or 20 miles farther north, the prairies are comparatively high and dry (though not over 75 feet above sea-level), which probably makes as much difference in the vegetation as the composition of the soil does.

The prairie country stretches westward from Opelousas and Lafayette at the edge of the Mississippi bottoms to the bottoms of the Calcasieu River, and like most prairies is almost perfectly level. Toward the western edge, however, in the gray silt prairies, there are numerous low mounds rising a foot or so above the general level, which make the vegetation a little more diversified than it would be otherwise. There are also quite a number of strips and patches of timber, mostly along streams, so that one hardly ever has an unobstructed view of more than two or three miles in any direction. Eastward the trees are all deciduous, but toward the west pines appear in increasing numbers, mostly *Pinus Taeda* on the northern route and *P. palustris* on the southern route. Where the prairie is bordered by deciduous forests the boundary is sharp, but the edge of the pine forest is ill-defined, probably on account of fire, as on the Hempstead Plains of Long Island.*

* See Mem. Torrey Club **17**: 271. 1918.

The original prairie vegetation is now nearly all replaced by fields and pastures. In St. Landry Parish sometimes as many as fifty farm-houses can be seen at once, between stations, each with a few trees around it, and most of them with "French" chimneys of sticks and mud. Water is usually obtained from cisterns, as in the delta. Rice, corn and cotton are the leading crops, in order of acreage. The commonest native and naturalized plants seem to be as follows:

TREES

Liquidambar Styraciflua	*Hicoria alba*
Pinus Taeda	*Nyssa sylvatica* (?)
Quercus stellata	*Quercus falcata*
Pinus palustris	*Quercus Michauxii*
Quercus Phellos	*Taxodium distichum*

SHRUBS

Myrica pumila	*Baccharis halimifolia*
Cephalanthus occidentalis	

HERBS

Paspalum Vaseyanum	*Gaura Lindheimeri*
Panicum hemitomon	*Baptisia leucophaea**
Helenium tenuifolium	*Dracopis amplexicaulis* (?)
Eryngium yuccifolium	*Croton capitatus*
Mesadenia lanceolata	*Silphium laciniatum*
Tillandsia usneoides	*Typha latifolia*
Hibiscus incanus (?)	*Baptisia* sp.
Nama ovata (?)	*Sesbania macrocarpa* (?)

The trees are mostly along streams, as above stated, and *Myrica pumila* occurs near the pine forests, especially on mounds, where it can keep its roots reasonably dry. The first and third herbs listed are obnoxious weeds, and the second grows in wet places

* In Robinson & Fernald's Manual this is treated as synonymous with *B. bracteata* Ell., a species known only from dry woods in Georgia and Alabama (see Bull. Torrey Club 33: 533. 1906), but the range attributed to it excludes those two states entirely.

and may be more characteristic of the marshes south of the prairies.

Outside of Louisiana and Texas these prairies probably have their nearest counterpart in the Grand Prairie of Arkansas,* which although considerably nearer to centers of ecological activity is even less known botanically than the Gulf coast prairies.

The Long-leaf Pine Region

West of the prairies are the long-leaf pine forests, about fifty miles wide on my northern route, but hardly extending south of Lake Charles at all. The topography where I crossed is gently rolling (doubtless a little more hilly farther north), with grayish loamy soil and clayey subsoil, and very few streams (unlike most of the pine-barrens of the Atlantic slope, where the sandy soil holds considerable water which seeps out in the valleys gradually throughout the year). Mosquitoes were rather abundant, though, strange to say. The region is very sparsely settled, and even yet lumbering seems to be more important than farming.

Pinus palustris outnumbers all other trees by a large majority, and on uplands where the lumberman has not yet begun operations it makes a pure stand with no woody undergrowth of any kind. These pine forests are denser than most of those east of the Mississippi River, as observed long ago by Dr. Mohr,† who found, probably in what is now Beauregard Parish, 35,000 board feet on a single acre,—which is several times the average for the southeastern pine forests.

Just two weeks before my 1918 visit southwestern Louisiana had been swept by a hurricane, and in some places as many as 10 per cent. of the pines had been blown down, and many leaves and branches stripped from the deciduous trees. The commonest trees besides the long-leaf pine seem to be *Nyssa biflora* (?), *Liquidambar, Pinus Taeda, Magnolia grandiflora, Quercus Michauxii, Fagus, Nyssa uniflora, Quercus falcata, Q. alba, Taxodium distichum,* and *Ilex opaca,* in the order named. These

* See Plant World **17**: 40–44. 1914.

† See page 45 of the revised edition of his "Timber pines of the southern United States" (U. S. Forestry Bull. 13), 1897.

are chiefly confined to the vicinity of streams, like the trees in the prairies. The only common shrubs seem to be *Callicarpa Americana* and *Myrica cerifera*. The herbaceous flora was difficult to identify from a moving train, but it seems decidedly poorer in species than that of the southeastern pine-barrens, and not many plants were in bloom in August. The most abundant herb is a coarse grass, presumably an *Andropogon*, and the most conspicuous were two species of *Laciniaria*, which I have guessed to be *L. pycnostachya* and *L. acidota*. (A little later I had opportunity to examine the pine-barrens more closely in eastern Texas, and the results are published in the *Bulletin* for July, 1920.*

The Hammock Forests

Within a few miles of the Sabine River the country is low and clayey and probably occasionally inundated, though the soil would hardly be classed as alluvial. These conditions are unsuited to long-leaf pine, and the forests are comparatively dense and hammock-like, with approximately the following composition:

Trees

Pinus Taeda	*Quercus Phellos*
Liquidambar Styraciflua	*Quercus falcata*
Nyssa uniflora	*Quercus stellata*
Quercus Michauxii	*Quercus Marylandica*
Taxodium distichum	*Hicoria aquatica* (?)

Shrubs

Cephalanthus occidentalis	*Aralia spinosa*

Herbs

Tillandsia usneoides

Most of these are the same species already noted as growing along streams in the pine-barrens, and this might be regarded as merely one of the strips of bottom-land timber, but for the fact that it is considerably wider on the Texas side, where it deserves to rank as a distinct region.

* Bull. Torrey Club 47: 289–319. 1920.

The foregoing notes, incomplete as they are (being based on only about eleven hours of travel), may be useful to those who may hereafter study Louisiana vegetation more intensively; and they illustrate a method of making observations in comfort in an interesting area where mosquitoes and scarcity of water might make traveling on foot rather disagreeable in summer.

THE VALUE OF NUTRIENT SOLUTIONS AS CULTURE MEDIA FOR FERN PROTHALLIA*

By Elizabeth Dorothy Wuist Brown

The value of nutrient solutions as culture media for growing fern prothallia under experimental conditions being so well known, it is the purpose of this paper to emphasize the value of these solutions for growing prothallia for class use. Excellent cultures may be obtained by using soil, peat and various other media, but it has been the writer's experience that the work is greatly simplified by the use of the nutrient solution. For after the solutions have been prepared and the cultures set up under the best light conditions available, little attention need be paid to them.

Aside from the time-saving element in caring for the cultures is the advantage of having an abundance of material in various stages of development always at hand. In this way it is possible for the student to follow the development of the prothallia from the one-cell stage to the adult form bearing antheridia, archegonia and sporophytes. This may be accomplished by varying the time of sowing the spores in the different cultures. It is well to learn the length of time required for the germination of the spores and the development of the prothallia of the particular species used before setting up the cultures for class use. The time of germination varies somewhat in different species, being more rapid in the spores containing chlorophyll.

The following solutions, Beijerinck's, Borner and Lucanus's, Knop's, Prantl's and Sachs's, proved favorable for the germina-

* Contribution from the Osborn Botanical Laboratory.

tion of the spores and the development of the prothallia of the various species of the Polypodiaceae used. However, Knop's and Prantl's solutions were on the whole the best suited, espe-

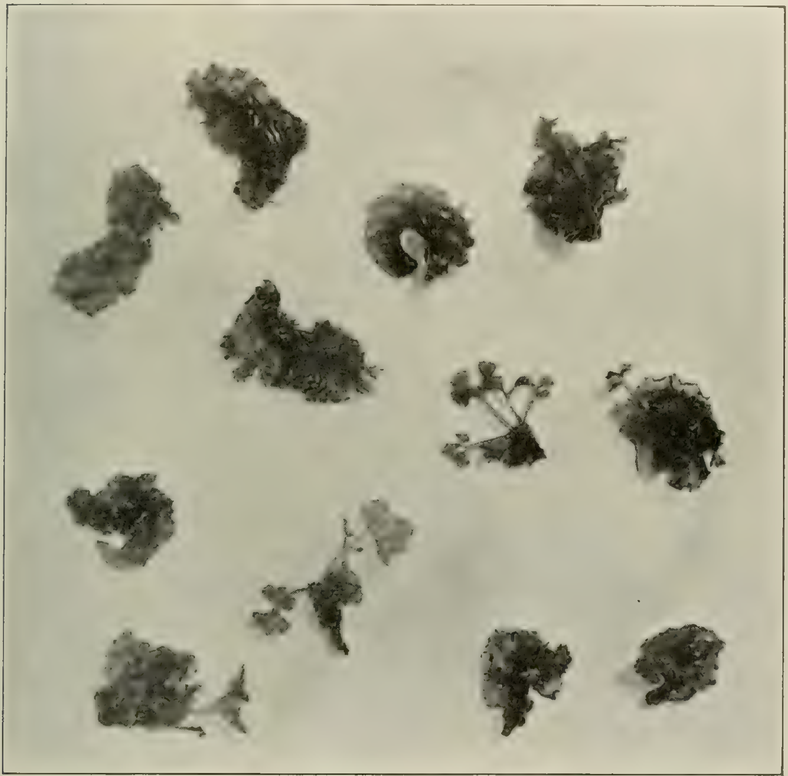

FIG. 1. Prothallia and young sporophytes of *Onoclea struthiopteris* from various nutrient solution cultures.

cially the latter as it did not seem favorable for the development of algae. The formulas for making up these solutions are as follows:

1. BEIJERINCK'S SOLUTION.

NH_4NO_3	0.5 g.
KH_2PO_4	0.2 g.
$MgSO_4$	0.2 g.
$CaCl_2$	0.1 g.
$FeCl_3$	trace.
Distilled water	1000 c.c.

2. Birner and Lucanus's Solution.

$MgSO_4$	0.5 g.
$Ca(NO_3)_2$	1.5 g.
KH_2PO_4	1.0 g.
$FeCl_3$	trace.
Distilled water	1000 c.c.

3. Knop's Solution.

$MgSO_4$	0.25 g.
$Ca(NO_3)_2$	1.00 g.
K_2HPO_4	0.25 g.
KCl	0.12 g.
$FeCl_3$	trace.
Distilled water	1000 c.c.

4. Prantl's Solution.

K_2SO_4	0.7 g.
NaCl	0.23 g.
$CaSO_4$	0.7 g.
$MgSO_4$	0.5 g.
NH_4NO_3 solution, 0.064 per cent	20 c.c.

5. Sachs's Solution.

KNO_3	1 g.
NaCl	0.5 g.
$CaSO_4$	0.5 g.
$MgSO_4$	0.5 g.
$CaHNO_4$	0.5 g.
Distilled water	1000 c.c.

Experience has shown that it is best to omit the ferric chloride from the stock solutions and to add a drop of a 1 per cent solution of ferric chloride to the nutrient solution of each culture before the spores are sown.

It is best to make up a liter of the nutrient solution, being very careful always to use only pure chemicals and distilled water. It is not necessary to sterilize the solutions, in fact cultures seem to do better on unsterilized solutions, especially those containing ammonium nitrate, probably because of chemical changes caused by heating.

Solutions should be kept in flasks or bottles well-stoppered with cotton in a clean place. Great care must be exercised in opening the flasks in the laboratory or the solutions will become

contaminated with algae or fungi. This is especially true when replenishing the culture media after the prothallia have begun to develop. Solutions should never be poured directly from the stock flasks or bottles into the culture dishes but they should be poured into a clean graduate, beaker or other receptacle and from this into the culture. In this way it is often possible to keep

FIG. 2. Young sporophyte growing in Knop's Solution

the stock solutions pure, althoug the cultures have become contaminated. However, if they do become infested it is best to throw them away and, after cleaning and sterilizing the flasks, prepare new solutions.

In making up solution cultures it is possible to use a glass dish of any size which can be covered with a glass lid or plate, but on

the whole small glass capsules about 1¼ inches high, with a diameter of 2½ inches, seem best suited. These hold about 26 c.c. of nutrient solution. This amount of nutrient solution will provide sufficient nourishment for a large number of prothallia to grow to maturity. However, owing to evaporation, it will be necessary to add fresh solution from time to time. The advantages of using a dish of this size are many: it is easily handled by both student and teacher; it can be placed under a compound microscope and the growth of the culture observed; it does not occupy so much space on the laboratory table and therefore is not so liable to accident; and, if by chance it does meet with one or becomes too badly infected by algae or fungi, its loss is not so great. Sometimes a culture may be freed from an algal or fungous growth by lifting the prothallia with a sterilized seeker or sharp-pointed scalpel from the old solution to a new one in a clean dish. Care must be taken not to immerse the prothallia in the solution, for if this accidentally happens it will require care to make them remain on the surface afterward. Sometimes this can be accomplished by drying the upper surfaces of the prothallia with filter paper. For study by a class in beginning botany it is perhaps best to select a fern whose prothallia under normal conditions are monoecious. For this reason various species of *Aspidium* or *Camptosorus rhizophyllus* may be used, although the rarity of the latter often makes this impracticable. Among a large number of the so-called "dioecious" prothallia, especially in the older cultures, a large percentage of monoecious prothallia occur. It is also possible by allowing cultures of various species in which large, vigorous, dioecious female prothallia predominate to become poor in nourishment and in this way to lower their vitality and thus convert them into monoecious prothallia. One way to do this is not to replenish the media with new from time to time, but to allow the prothallia to continue their growth on the same solution upon which the spores have been sown. Since this requires practice and skill in handling the prothallia as well as an acquaintance with the prothallia of the particular species under cultivation, it will hardly be practicable in most cases, unless one

wishes to demonstrate the effect of nourishment on the development of the reproductive organs in fern prothallia.

Fertile fronds of the species to be used should be collected as soon as the spores are ripe. After drying them, by placing them before an open window for a few days, they should be wrapped in paper and placed in a covered pasteboard box in a cool, dry place. When preparing the spores for sowing, shake a frond over white paper or a clean glass plate. Crush the sporangia obtained with a scalpel or a microscopic slide, being very careful not to crush the spores. The spores should be freed from the remains of the sporangia before sowing them and this may be done by rubbing the crushed mass through a sieve of varying thicknesses of silk bolting cloth (which may be procured from a flour mill) stretched in a small embroidery hoop. By adding or removing a thickness of the cloth the grade of the sieve can readily be adjusted.

The most successful of the various methods tried for sowing the spores is as follows: A mass of spores is taken on the point of a scalpel and the instrument is moved over the capsule about half an inch above the surface of the medium, while the spores are gently blown upon. In this manner the spores are fairly evenly distributed. This should be done as quickly as possible and the cover of the capsule replaced in order that the culture medium is not exposed so long to the air. Likewise, whenever examining or removing prothallia from a culture, do not leave it uncovered any longer than is necessary. Never invert a cover. It is well to make up a number of cultures, one or two for each table of the different laboratory sections with a few in reserve.

After the cultures are made it is best to place them before a window, preferably an east window, where they are exposed to the direct sunlight for a part of the day. This is especially necessary during the period of germination. If the cultures are started in warm weather it is best not to allow them to remain in the sunshine longer than one or two hours at a time as the prothallia do not develop as well when the culture solution becomes heated. The spores of some species fail to germinate if the culture solution remains too warm. The optimum temperature for

prothallia is 60° F., although they will continue to do well in a room whose temperature is much higher provided the culture solution is not allowed to become overheated by exposure to the sun's direct rays.

Cultures may be labelled in various ways, but the most convenient one is to write on the cover of the capsule near the edge with a glass pencil the name of the species, the solution used for the culture medium and the date of sowing the spores. By abbreviating the name of the species and by the use of either a letter or Roman numeral for the culture solution and of figures to indicate the date, the inscription need not occupy much space. For example, "A. S.—P.—11/4 '20" = *Aspidium spinulosum,* Prantl's Solution, November 4, 1920. Although it is not absolutely necessary to label the cultures if only one species and one culture solution are used, still it is well to have the date when the spores were sown indicated.

When the prothallia are distributed for laboratory study, it is best to remove a part of the culture to a watch glass, being careful to use clean instruments and to return the cover to the capsule as soon as possible. Under a dissecting microscope by means of needles, the prothallia may then be teased apart, as the rhizoids frequently become interwoven, and placed in another watch glass from which to be distributed to the students. In this way the students secure better mounts, a great deal of time will be saved and a waste of material avoided. If more prothallia have been removed from the culture than are needed immediately, the remainder can be kept in excellent condition by adding a few drops of water and placing the watch glass in a moist chamber. This moist chamber can be made by inverting a bell jar over a plate in which a little water is allowed to stand. The prothallia may be returned to the culture if care is used not to submerge them as has been previously stated.

Young sporophytes may be removed from the culture and placed in watch glasses containing nutrient solution, supported by tiny pebbles in such a manner that the young leaves are above the solution and the young root immersed (Fig. 2). The watch glass should be covered with a bell jar. These sporophytes

can be kept alive for months if care is taken to replenish the nutrient solution and not to expose the young sporophyte too long to the dry atmosphere of the laboratory.

These details of technique have been the gradual outgrowth of the writer's experiences with many cultures of fern prothallia of the various species of the Polypodiaceae. Especial emphasis is laid upon careful and painstaking attention to details, and it is only by experience that the value of so doing will be understood and appreciated.

TWO NEW WEST INDIAN PLANTS

By N. L. Britton.

An Undescribed Stenophyllus from Jamaica

The species of the sedge genus *Stenophyllus* hitherto known to inhabit Jamaica* are *S. junciformis* (H. B. K.) Britton, which has been collected in Clarendon and St. Andrew's, and *S. capillaris* (L.) Britton, definite localities for which are at present unknown.

To these, Mr. William Harris has recently added an undescribed one, growing on a damp rocky slope at Old England Falls at about 1100 meters elevation in the Blue Mountains to be named and characterized as follows:

Stenophyllus Harrisii sp. nov.

Densely tufted, with short rootstocks. Culms weak, glabrous, about 6 dm. long and 1 mm. thick; leaves reduced to basal sheaths bearing ciliate blades 3 cm. long or less; spikelet solitary, about 8 mm. long, subtended by one or two appressed bracts 5–6 mm. long; scales few, ovate to ovate-oblong; style-branches 3; achene obovoid, trigonous, about 0.7 mm. long, its broad top bearing a minute black tubercle.

Old England Falls, Jamaica (*Harris 12908, type; 12890*). In *12890* most of the spikelets are transformed into tufts of short linear leaves.

* Bull. Torrey Club 43: 447.

An Undescribed Croton from the Virgin Islands

Croton Fishlockii Britton, sp. nov.

A low, much-branched shrub, the young twigs sparingly long-pilose, with very short internodes. Leaves broadly elliptic to suborbicular, rather thin, 6–22 mm. long, 5–15 mm. wide, rounded or obtuse at both ends, pinnately few-veined, sparingly long-pilose and with rather copious black stellate hairs, the long-pilose petioles 2–8 mm. long; flowers few, in small terminal clusters, or solitary. Staminate flowers: sepals ovate to elliptic-ovate, 2.8–3 mm. long, 1.8–2 mm. broad, stellate-pubescent on the back; petals obovate to broadly obovate, 3 mm. long, 2–2.2 mm. broad, villous within; stamens 12, the filaments villous near the base.

Top of the mountain in Virgin Gorda, Virgin Islands, at about 425 meters altitude (*W. C. Fishlock, No. 311,* May 9, 1919).

A very interesting distinct species, related to *Croton lucidus* L. I take pleasure in dedicating it to Mr. Fishlock, who has been in charge of the Botanical Station at Roadtown, Tortola, for a series of years, and who has made extensive collections of the Virgin Island flora, adding greatly to our knowledge of the distribution of species of Tortola, Virgin Gorda and Anegada. *Croton lucidus* L., apparently its nearest relative, has not been found in the Virgin Islands.

REVIEWS

Hitchcock's Genera of Grasses of the United States *

At the present low ebb of systematic botany, due largely to the deplorable schism over the question of nomenclatorial rules, the appearance of a work of such scope from the pen of our leading agrostologist is of capital importance to every student of the grasses. Sufficient time has elapsed since the publication of Scribner's American Grasses in 1900† to make a new exposition of grass-genera extremely desirable. Many of the views set forth in the present volume were foreshadowed in the author's

* Hitchcock, A. S., The Genera of Grasses of the United States, with special reference to the economic species. U. S. Dept. of Agric. Bull. No. 772: Washington, Govt. Printing Office, March 20, 1920. Pp. 1–307; 174 figs., 20 plates. Price .40.

† U. S. Dept. Agr. Div. Agrost. Bull. 20.

Text-Book of Grasses (1914), but a fuller and more adequate treatment was urgently needed. Professor Hitchcock's sound and sane conservatism has not permitted him to depart too widely from the fundamental doctrines of modern agrostology yet the present work is by no means a mere compilation of existing views, but marks in several respects a distinct advance over our previous knowledge.

The attention of the reviewer naturally was first drawn to that stone of stumbling and rock of offense, the correct position of the tribe Oryzeae. The Gordian knot has been neither untied nor cut. After following Hackel and Scribner by placing the tribe in the sub-family Panicatae in the Text-Book of Grasses, Professor Hitchcock has now returned to the view taken in his revision of the Gramineae for the Seventh Edition of Gray's Manual (1908), and included the tribe again among the Poatae. Evidently therefore the laterally-compressed spikelets now appear to him a character of greater significance than the articulation of the rachis *below* the glumes. As a matter of fact, the tribe presents an *impasse* that can never be satisfactorily evaded as long as the two sub-families are delimited as at present. Undoubtedly there will always be good grounds for maintaining these two series for the majority of the genera; but there is a progressive obliteration of sharply-opposed characters as we descend toward the median line, until we reach a debatable ground in which the two sets seem to be inextricably blended. Perhaps the most noteworthy advance in taxonomy afforded by the present volume is in the new sequence of tribes. The arrangement that has been uniformly followed hitherto has been strikingly illogical, in that it involved a progression from the most highly-developed to the most primitive forms. The bamboos, as showing the least differentiation in floral structure, should evidently begin the sequence, and the allies of *Tripsacum* should close it as the most complex We accordingly find in the present work that the Poatae stand first, with the tribes in the following order: Bamboseae, Festuceae, Hordeae, Aveneae, Agrostideae, Nazieae, Chlorideae, Phalarideae, Oryzeae and Zizanieae (the latter tribe cut off from Oryzeae on the basis of the unisexual spikelets, leaving only

Oryza and *Homalocenchrus* to represent the original tribe), and the Panicatae are in second place, in the order: Melinideae, Paniceae, Andropogoneae and Tripsaceae (the latter name very properly taken up instead of Maydeae, since the genus *Mays* is no longer maintained). The author is careful to point out, however, that no arrangement in a purely lineal sequence can represent the tribal relationships, and repeats the view set forth in his Text-Book (p. 157), that the phylogenetic development has not been along a *single* line. At least three dimensions would seem necessary to a satisfactory schematic representation of this relationship! Here is foreshadowed the great future problem to be solved by grass-systematists. The placing of Nazieae among the Poatae seems to be justified by the articulation of the spikelet *above* the glumes; and the near relation of *Hilaria* and *Aegopogon* to certain of the Chlorideae suggests to the author a disposition by which these two genera will ultimately be cut off from *Nazia* and its allies. Whether the distinction between Zizanieae and Oryzeae can be maintained for the genera not represented in the United States which are usually referred to Oryzeae, notably the anomalous *Streptochaeta* and *Reynaudia,* the author does not attempt to decide. Another noteworthy innovation is found in the placing of *Munroa* among the Chlorideae, where it finds a place next to *Cathestecum,* previously transferred in the same way by Griffiths* from the Festuceae. The genus *Triodia* is restored, with the comment that it does not seem practicable to segregate any of the species as distinct genera. The name *Aira* is taken up for what has been known as *Deschampsia,* the author holding that the Linnaean type should be selected from among the first four rather than the last two species (*A. praecox* and *A. caryophyllea* being species from southern Europe, and not included by Linnaeus either in the Flora Lapponica or Flora Suecica). The little annuals heretofore called "Aira" are placed in Adanson's genus *Aspris.*† *Melica* is not subdivided, although the presence of the club-shaped rudiment is maintained as a distinguishing character—a procedure which makes the reference of

* Contr. U. S. Nat. Herb. 14: 358. 1912.

† Adans. Fam. Pl. 2: 496, 522. 1763.

any species of the section *Bromelica* to the genus a matter of extreme difficulty for the beginner.

The author adopts Piper's* view that what has been known as *Agrostis alba* L. should be called *A. palustris* Huds., the original name having been founded on what was almost certainly a species of *Poa*; and *A. capillaris* L. is in like manner taken up for what has usually been called *A. alba* var. *vulgaris* Thurb., the "Rhode Island bent." *Apera* is regarded as insufficiently distinct from *Agrostis* and replaced in that genus. *Sphenopholis* and *Koeleria* retain the position among the Aveneae to which Professor Hitchcock has always regarded them as entitled.

The synonymy is complete for all generic names based on American species; and all such names, whether valid or in synonymy, are placed on a type-basis. A careful study has been made of each genus with a view to ascertaining which of the species the author had chiefly in mind, so that the arbitrary method of selecting the first-mentioned valid species as the type is avoided. A brief of the publication of each generic name is given, and in each case the reason for selecting the species taken as the type is stated. The law of priority is strictly applied, and the "nomina conservanda" of the International Rules are in no case maintained. Each genus is technically described, and its scope and distribution indicated. As was inevitable in a publication of the Department of Agriculture, all the economic species under each genus are mentioned, so that the user of the book should be able to refer any of these species to its proper genus. The author's interest in his subject, however, often leads him to extend his treatment to include species of no economic significance.

The illustrations with two exceptions (*Euchlaena* and *Coix*) are all new, and specially prepared for this work, the habit-drawings by Mary Wright Gill, and the details of the spikelet by Agnes Chase. The figure of *Hydrochloa caroliniensis* on p. 213 is an admirable example of the fidelity and accuracy of Mrs. Gill's work. The high cost of paper is doubtless responsible for placing a photographic plate on *each* side of the inserted leaves.

*U. S. Dept. Agric. Bull. 692. 1918.

One new species (*Epicampes subpatens,* from New Mexico) is published, and fourteen new combinations are formally made. The proofreading has been done with the most scrupulous care, in pleasing contrast to the carelessness displayed in some of our recently-issued manuals. The reviewer is inclined to regard Beauvois's correction* of Rafinesque's "Diarina"† to *Diarrhena* as valid under any set of rules; but Rafinesque's lordly indifference to all matters etymological makes it inadvisable to be dogmatic in regard to the correct spelling. It is doubtless an excess of purism to inquire why *Lepturus* is treated as feminine and *Pholiurus* as masculine (pp. 105, 106). *Chaetochloa palmifolium* (p. 243) is the only other error in agreement observed. The word "palea" is used throughout instead of the Anglicized "palet," thus conforming to "lemma"; but strict consistency would also require the use of "gluma."

Cynosurus cristatus is not "the only species in the United States" (p. 68), as *C. echinatus* L. is becoming well established in Western Oregon. *Coleanthus* is regarded as "introduced" (p. 133), although it is hard to see on what ground, since it is nowhere an associate of cultivated plants, and has a sufficiently wide distribution in Eurasia to justify the presumption that it is a cosmopolite. *Torresia macrophylla* is not merely "Californian," (p. 201) but extends northward at least to the Columbia River. *Homalocenchrus oryzoides* is not limited to the "eastern United States" (p. 206) but is of frequent occurrence in the Wilamette Valley.

Those who have followed in successive publications the steady evolution of Professor Hitchcock's views on systematic agrostology, will hope that this admirable contribution may in future find its logical culmination in an equally sound and able treatment of all the grass-species represented in the United States, which will be for the entire family what Hackell's exposition of the Andropogoneae has been for that tribe, and will for all time confirm the author's right to rank as a worthy continuator of the work of Beauvois, Trinius and Hackel. JAMES C. NELSON

* Ess. Agrost. 142. 1812.

† Med. Repos. 5: 352. 1808.

PROCEEDINGS OF THE CLUB

February 25, 1920

A meeting of the Club was held at 3.30 P.M. at The New York Botanical Garden. Dr. H. A. Gleason presided. There were 21 persons present.

The minutes of the meetings held January 28 and February 10 were adopted.

Mr. William T. Arnold and Mr. Charles E. Fairman were elected to membership. The resignation of Dr. O. E. White was accepted. The death on November 8, 1919, of Mr. E. C. Wurzlow was noted.

Dr. R. A. Harper, on behalf of the committee charged with the selection for nomination of a candidate or candidates for the offices of Secretary and Treasurer, reported, suggesting Dr. F. W. Pennell for both these positions. The joint tenure of these offices has been found of much convenience. Dr. Pennell was elected Secretary-Treasurer.

The Treasurer was authorized to renew insurance upon our stock in the basement of the library of Columbia University.

The resignation of Dr. Pennell as Chairman of the Field Committee was accepted.

The scientific program consisted of two titles:

Dr. H. M. Denslow discussed "Our Native Orchids." After an introduction telling of his own long acquaintance with the orchids of our northeastern, and especially our local, flora, the speaker entered upon his real theme. This considered first the status of our knowledge of orchids; emphasizing the limitation of present knowledge and stating as reasons for this (*a*) the shortness of flowering-season of some species, (*b*) the minute size of flowers and general inconspicuousness of some species, (*c*) the unexpected habitats of some species, and (*d*) the sporadicity of occurrence of yet some species. Then he called our attention to the imperfect representation in herbaria, and locally in our Club collection at The New York Botanical Garden, of our orchids, emphasizing the need of a collection sufficiently ample to show us the distribution of each sort. The same want is evi-

dent in the Garden's own herbarium. The speaker insisted upon the urgent need of soon building ample herbaria as, because of the increasing rarity and even disappearance of certain species, it will later be impossible to obtain such data.

For the obtaining of information concerning our orchid-life Dr. Denslow suggested: (*a*) more state and other local floras (studies to give status of orchids and other plants in the same waning condition), (*b*) exploration, (*c*) increase of our herbarium, and toward this he advocated a system of exchanges. For the recording of our information as to species-ranges, and our help in realizing where exploration is most needed, he advocated plotting known areas of occurrence upon blank outline maps.

Dr. Denslow closed with the injunction that in the next ten or fifteen years we must discover whatever we wish to know concerning the occurrence or many native orchids—therefore "be up and doing!"

Dr. Alfred Gundersen showed and discussed "Labels and Records for Herbaceous Plants." The Brooklyn Botanic Garden has had difficulty with the wanton transference or removal of labels from the beds for herbaceous plants. The resulting confusing of data was first obviated by the mapping of their plantings; still for the public who had to depend upon the labeling present, this was not sufficient. Finally, after a series of experiments, there has been adopted a metal two-faced label, firmly secured to a post and so placed between two plantings on each side that each wing of the label and each face of each wing will designate a planting, the whole labeling four plantings. The permanence and obvious economy of such a label should lead to its wide adoption.

The meeting adjourned.

Francis W. Pennell,
Secretary

The Torrey Botanical Club

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OF THE

TORREY BOTANICAL CLUB

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Of former volumes, only 24–46 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–46 three dollars each.

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(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–15 are now completed; No. 1 of Vol. 16 has been issued. The subscription price is fixed at $3.00 per volume in advance; Vol. 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00. Certain numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

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DR. FRANCIS W. PENNELL
2764 Creston Avenue
New York City

Vol. 20 September–October, 1920 No. 5

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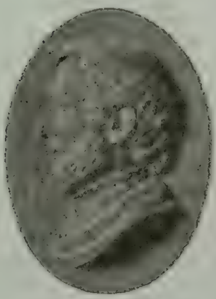
A Bi-Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR



JOHN TORREY, 1796–1873.

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HABITS AND HABITATS OF THE NORTH AMERICAN RESURRECTION FERN

By E. F. Andrews

This interesting little plant, known to science as *Polypodium polypodioides*, is closely related to the common polypody (*P. vulgare*) of the North, and one of its local names, "Little Polly," is evidently a popular recognition of the relationship. Other common local names are "fern moss," "moss fern," "tree fern" —from its epiphytic habit of growing on the trunks of trees—and more generally, "resurrection fern," from the manner in which it shrivels up during dry weather as if dead, and comes to life again after every shower of rain.

It is said to be sometimes found as far north as southern New York, and Pennsylvania, whence it ranges west to Illinois and Missouri and south to Florida and Texas, and on throughout tropical America. In the warm, moist climate of our southern coastal plain it finds a congenial home, and is so conspicuous on the live oaks there as to create the impression among tourists and other casual visitors that it does not grow on any others; but this is because they don't look for it anywhere else. Mrs. A. P. Taylor, of Thomasville, Ga., a very competent observer, writes: "It may be of interest, especially to those who believe in its preference for the live oak, to know of the various trees on which I have found it; . . . Here (around Thomasville) it grows on oaks, beech, maple, magnolia (*grandiflora* and *glauca*), *Oxydendron*, *Osmanthus*, tulip tree, *Symplocos*, *Cliftonia*, China tree (*Melia Azedarach*) and red cedar. I have never seen it on *Taxodium* or *Pinus*."

[No. 4, Vol. 20, of Torreya, comprising pp. 67–90, was issued September 20, 1920]

In the part of its range with which I am best acquainted, the middle and northern portions of Georgia and Alabama, its favorite hosts are the post oak, the elm, and tulip tree, though it is found in greater or less abundance on many others. I have even seen it on the stem of a large poison oak vine (*Rhus radicans*) that had climbed the trunk of an old tulip tree on which the fern had established itself. But so constant is its preference for the elm and post oak that its presence is a convenient test for dis-

Fig. 1. Post oak on a street in Washington, Ga.; the trunk and lower branches covered with a growth of Resurrection Fern.

tinguishing them at a glance, in winter, from other trees of similar habit and exterior when in the leafless state. As a general thing it avoids trees with a smooth or exfoliating bark. The reason for this is obvious, since it could not well secure a foothold on such uncertain supports. There are, however, many exceptions. The magnolia and bay have both very smooth bark, and the cedar exfoliates in long fibrous strips, yet it is not uncommon on all of these. I have never seen it on any kind of a

pine, nor on the hackberry (*Celtis occidentalis*). The bark of this tree is normally smooth like that of the beech, and though it usually becomes very rough and scabby on the trunks and lower branches of old trees, it is so hard and unretentive of moisture that it does not attract the colonies of lichens and mosses which establish themselves so freely on other species, and this fact probably has a more direct influence upon the polypodium's choice of a habitation than the character of the tree upon which it lodges. The fern is not a parasite and its roots never penetrate the living tissue of the host, but there seems to be a symbiotic relation between it and a certain soft, plush-like moss with which it is usually associated, the fern giving shade to the moss, while the latter serves as a reservoir to retain the moisture without which the rootstocks of its partner could not keep alive through periods of protracted drought.

Another peculiarity in regard to habitat is that our "little polypody" does not seek the seclusion of deep sequestered woods like most of the other ferns, but is most frequently found on the trunks and boughs of shade trees around dwellings and on the borders of roads and open woods. It is a familiar object on shade trees in all our southern towns, and instead of avoiding the presence of man seems to flourish best in his neighborhood. This is readily explained as an adaptation to its aerial habit—or possibly the habit may be an adaptation to the situation. If it had always confined itself to low-lying positions on logs and stumps, or on tree trunks in the deep shade of crowded forests where its spores could be carried only a short distance from the parent plant, it is easy to see that it could hardly have become, as it now is, one of the most widely distributed of American ferns.

Its range frequently overlaps that of the common polypody, especially among the Southern Appalachians and their foothills, where it occurs in patches on the face of rocky cliffs and the shelving sides of moss-covered bowlders, as well as on the roots and trunks of trees. The common polypody is of frequent occurrence on top of Lookout Mountain, and I have found occasional specimens of the "little Polly" in Walker Co., Ga., growing

in patches with moss, on the declivity below the great sandstone parapet. But wherever found it can always be readily distinguished from *P. vulgare* by the much smaller, coriaceous, oblong to triangular-lanceolate fronds, covered on the under surface with a thick grayish brown scurf. This scurfy coating plays an important part in connection with the drought resisting qualities of the plant. Viewed under a good hand lens it is seen to consist of a multitude of minute gray scales, each with a dark brown spot in the center. These scales cover the stomata or transpiration pores on the back of the frond, and when there is a dearth of moisture they retard evaporation from the surface, thus causing the frond to curl over on its face, exposing to the sun and air a scale armor that checks evaporation and thus enables the plant to preserve its vitality without water for an astonishing length of time. The agency of the scales in this important function was tested in a number of experiments by removing them* from one or more healthy fronds, leaving others on the same rootstock in their normal condition, and noting the relative time of wilting or recovery in each case. When fresh fronds were deprived of moisture, the denuded frond, other things being equal, always wilted more quickly than the others; but when conditions were reversed and dry specimens placed in water on a bright, clear day, the naked frond, on account of more rapid transpiration, recovered more slowly. In one experiment, where only one half of a vigorous, healthy frond was denuded, the two sides showed very little difference in warm, rainy weather, but when the atmosphere was dry the naked side was first to show signs of wilting, though the difference was not so marked as in the case of separate fronds.

To decide how long the polypodium can tolerate continuous drought without losing its vitality, a number of experiments were carried on at different times and places. In these, each of the specimens used was gathered with its mossy substratum intact, and kept in a dry place, where portions were separated from it at intervals and placed in water as long as any of them continued

* This can be done without injury to the epidermis, by gently scraping off the scales with a sharp knife while in the expanded state.

to show signs of life. There was considerable variation in the results obtained, but not more than might be expected on account of differences of climate in the various localities, the nature of the season, the health and vigor of the individual plants dealt with, etc. It would take too much time and space to go into the details of these experiments, but the results of one of them, which was continued for more than a year, are so interesting that a brief outline of it is given here.

On December 30, 1913, a large mat of polypodium (about 25 x 48 cm.) was gathered from a rocky hillside near Rome, Ga., where it was growing in a thick substratum of moss on one of the numerous outcroppings of shale and slate that form the ribs of the hill. The strata are tilted in such a way that the edge of the laminae is for the most part turned upward, and the mould which collects in the crevices offers a convenient foothold where the polypodium and the prostrate cactus (*Opuntia humifusa* Raf.) are found in close proximity to each other. The fern, with its substratum of moss, peeled off from the rock entire, like the skin of a banana, and was transferred to a flat stone in the basement of my house. The weather being warm and rainy, the fronds were all fully expanded and in fine condition, and it was not until January 13, 1914, that they began to show signs of withering. By January 31, the substratum had become dry and the fronds were all withered. On April 11, May 17, and June 15, specimens detached from the mat with their substratum, and exposed in the rain, revised in each case, within from 12 to 24 hours.

On July 30, the remainder of the mat was removed from the basement to the drier atmosphere upstairs and left on top of a bookcase in my study. October 30 (95 days after removal from the basement) another specimen was put out in a warm mist at 8 P.M., without watering the substratum, and by the same hour next morning it had revived sufficiently to show that it was still alive. The same specimen was then placed in water, and after 12 hours more, the fronds were all expanded but looked weak and sickly. (Note: The best specimens had all been used up,

and the fronds, in this case, were rather small and poor to start with.)

After this the specimens showed a gradual decline both in the quickness of their response when supplied with moisture, and in the relative number of fronds that completely regained their normal condition. On March 8, 1915, after 7 months and 6 days in my study and 7 months in the basement—a total of more than 14 months without water, the last remaining fragment of the mat was placed out of doors on a rainy day, but only 2 fronds expanded fully and regained their normal color. The specimen was then left on a rock under the drip of a gutter on the north side of my house, but it never revived further, and finally died.

THE VEGETATION OF A CINDER FIELD

By George T. Hastings

In the summer of 1916 the Palisade Interstate Park Commission completed the reclaiming of some three acres on the west shore of the Hudson River opposite Hastings. A wall of boulders taken from a rock slide immediately to the north was built across the front of a shallow bay and the space between this and the shore filled in. The filling was first of ashes and rubbish from one to six feet in depth, over this a layer of cinders six inches to a foot in thickness was placed and the whole leveled off. The ashes and cinders were brought up from New York in scows and distributed by small cars run on a track that was shifted as the filling progressed. The final level is about three feet above high tide level. This cinder field made as nearly a sterile soil and one that could retain as little moisture as could well be imagined. The water level in the soil was near the surface and most of the available water for young plants was due to capillarity. The filling was competed so late in 1916 that there was little opportunity for any plant life to develop, but during the summer of 1917 the area became well covered with plants, chiefly growing individually with bare cinders all around but in places crowded together. The following year the tract was covered

with a layer of clayey soil about three inches thick and but few of the plants of the year before reappeared. In 1917 ninety-six species of flowering plants were found. No fern of any kind and but one little patch of moss, the latter on the ashes of a picknicker's fire and not reaching maturity, was found. The flora was distinctively a weed one with little relation to the native flora on the adjacent hillside. Possibly the only plants to come from the immediate vicinity were a few seedlings of the small-toothed aspen, poison ivy, red-berried elder, and poke-berry, one vigorous shoot of *Paulownia* in the rock wall-probably brought from the rock slide at the north where two good-sized trees of the kind grow—and a few heart-leaved asters. Aside from these six species all the plants, including all the abundant ones, seemed to have been brought from a distance. Some twenty-four species have seeds definitely adapted to wind dispersal and three or four are sticktights, these may have been brought in by wind and animals, nearly all the remainder have small seeds with no special adaptation for dispersal over long distances and were apparently brought either with the cinders, on the ties of the railroad, or by the laborers. To the latter undoubtedly were due the fruits, apple, cherry, strawberry and raspberry. An interesting case was that of the Mexican tea, *Chenopodium ambrosioides,* that in several places grew in well-defined lines of two hundred feet or more along the course of the small railroad. Probably the seeds had adhered to the ties and been jarred off where the track had remained in one place for some time. In midsummer petunias and morning glories of several color varieties and sweet alyssum were abundant over the whole area, and in the fall numerous plants of *Kochia* added bits of brilliant color. Many of the individual plants, having no close neighbors to crowd them, attained very large size. Single plants of *Panicum capillare* and *P. proliferum* grew to three and four feet in height and covered from ten to sixteen square feet. Late in the summer some of the species were crowded by seedlings. Under one plant of *Euphorbia maculata* that made a mat three feet in diameter the cinders were thickly covered with tiny seedlings. On one square foot over two thousand were counted.

As would be expected of a weed flora few of the plants were native, only 29 per cent., and over half were annuals. None of the trees on the hillside near by were represented by seedlings though their seeds must have been scattered over the field in the fall. Black birches hung over the edge of the filled land but the only birch seedlings were of the grey birch, possibly from a few small trees some distance to the south along the base of the slope. Seeds of many of the shrubs and herbs of the slope of the Palisades must have been blown onto the area during the fall and early spring, but conditions on the cinders were not favorable to germination.

The orders best represented were the grasses, with 17 species and the composites, with 22—the two together representing more than 40 per cent. of the species—the grasses exceeding all other plants in the abundance of individuals. Indications were that many of the plants would survive for many seasons and give character to the flora until sufficient humus had accumulated to give foothold to other species. But the covering of the cinders the following year either buried the seeds too deeply or brought in so many sod-forming grasses as to crowd them out. A few still persist but are not the dominant forms. A patch of sunflowers has come since where the one plant grew in 1917 but the petunias, morning glory, *Kochia* and most of the others have not reappeared. The plants found were as follows:

Syntherisma fimbriata	abundant over a small area.
Panicum capillare	abundant over most of the area.
Panicum proliferum	a few large clumps.
Echinochloa crus-galli	common.
Chaetochloa viridis	widespread.
Chaetochloa verticillata	one or two plants.
Chaetochloa Italica	a very few plants.
Muhlenbergia sylvatica	a very few plants.
Phleum pratense	a very few plants.
Aira caryophyllea	a very few plants.
Avena sativa	a few, possibly from horse feed—as horses were used in leveling the tract after filling.
Eleusine Indica	few.
Eragrostis major	very few.
Eragrostis capillaris	few.

Poa annua	few.
Puccinellia distans	very few.
Lolium perenne	very few on masses of good soil close to the inner edge of the fill.
Cyperus strigosus	very few.
Commelina communis	very few.
Populus tremuloides	very few seedlings.
Betula populifolia	few seedlings.
Rumex crispus	two or three plants.
Rumex acetosella	few.
Polygonum punctatum, leptostachyum	very few.
Polygonum convolvulus	few.
Polygonum pennsylvanicum	few.
Polygonum aviculare	two or three plants.
Kochia Scoparia	common over whole area.
Chenopodium ambrosioides	abundant.
Chenopodium album	common.
Atriplex hastata	very few.
Amaranthus retroflexus	few.
Phytolacca decandra	six or seven plants, all small.
Mollugo verticillata	abundant.
Portulaca oleracea	very few.
Koniga maritima	abundant.
Lepidium apetalum	abundant.
Brassica nigra	very few.
Brassica oleracea	very few.
Malus Malus	few seedlings.
Fragaria sp.	several seedlings.
Potentilla monspeliensis	very few.
Rubus occidentalis	one young plant.
Amygdalus Persica	few seedlings.
Trifolium pratense	very few.
Trifolium repens	few.
Trifolium hybridum	few.
Melilotus alba	very few.
Medicago sativa	one plant.
Medicago lupulina	very few.
Oxalis stricta	two plants.
Acalpha virginica	abundant.
Euphorbia maculata	abundant, and a great number of seedlings in the fall, 2,016 found on one square foot under a large plant.
Rhus radicans	two or three seedlings.
Epilobium hirsutum	very few.
Epilobium adenocaulon	very few.
Chamaenerion angustifolium	very few.
Onagra biennis	few.
Ipomoea purpurea	abundant over whole tract.

Verbena urticifolia	very few.
Verbena hastata	very few.
Petunia violacea	abundant.
Lycopersicon Lycopersicon	several.
Solanum nigrum	few.
Physalis pruinosa	very few.
Lycium vulgare	one plant.
Verbascum Thapsus	few.
Linaria Linaria	very few.
Paulownia tomentosa	one vigorous shoot at the edge of the water from a piece of branch wedged between rocks in the retaining wall.
Plantago Rugelli	very few.
Plantago lanceolata	very few.
Plantago major	very few.
Sambucus pubens	two plants.
Cucumis melo	one vigorous plant producing several melons.
Eupatorium purpureum	two or three plants, all small.
Eupatorium perfoliatum	one small plant.
Euthamia graminifolia	very few.
Aster cordifolius	very few.
Erigeron annuus	very few.
Leptilon canadensis	abundant, many with abnormalities of the flower clusters.
Anaphalis margaritacea	very few.
Gnaphalum obtusifolium	very few.
Helianthus annuus	one plant.
Bidens frondosa	few.
Bidens bipinnata	few.
Galinsoga parviflora	few.
Achillea Millefolium	few.
Chrysanthemum Leucanthemum	very few.
Erechtites hieracifolia	few.
Arctium minus	very few.
Carduus lanceolatus	one small plant.
Taraxacum Taraxacum	few.
Lactuca virosa	very few.
Sonchus asper	very few.
Ambrosia artemisiaefolia	very few.
Xanthium echinatum	very few.

SHORTER NOTES

"DISAPPEARING WILD FLOWERS."—In the *Journal of Botany* for May, under the above heading, it is stated that the London *Times* has published several letters calling attention to the destruction of our wild flowers and stating that "it is time that additional steps were taken to protect wild plants and flowers." In Devonshire, the home of the primroses, they are rapidly disappearing and there are very few of them left within a circle of twenty-five miles around London. Ferns and orchids also have been extirpated. "Even in areas such as public parks, where special prohibitions are in force, there has been increased defiance of them since the War, mainly owing to the diminution of effective supervision." This has been the case in the parks of New York City also and it emphasizes the danger to any flower that has become popular or is specially desirable.

E. G. BRITTON

NEW YORK BOTANICAL GARDEN

NEW SPECIFIC NAME.—I find that the specific name *oligocaenica* proposed by me* for a new species of *Inga* from the Culebra formation of the Canal Zone is antedated by *Inga oligocaenica* described by Engelhardt† in 1898 for a species from the Oligocene of the Mittelgebirge in Bohemia. The Panama Oligocene species may be called *Inga* **culebrana** in allusion to both the horizon and the locality.

EDWARD W. BERRY

A NEW FORM OF STANLEYA.—In the extreme western part of Kansas there is a *Stanleya* which agrees with none of those described. It is nearest to *S. glauca* Rydberg, but the leaves are much broader and the stem is not bluish green. Very possibly it should be considered a distinct species, but at present we do not know its exact status, and it seems better to regard it as a race or subspecies of *S. glauca*.

* Berry, E. W., Bull. U. S. Natl. Mus. **103**: 32. *pl. 16. f. 2.* 1918.

† Engelhardt, H., Tertiaerflora von Berand, 61. *pl. 4. f. 12.* 1898.

Stanleya glauca latifolia

Tall, robust, with pale green somewhat ribbed but not angular stems; cauline leaves light green, thick, glaucous, with a bloom, entirely glabrous, broad-lanceolate, entire, with thick well developed narrowly winged petioles, which on large leaves are not so long as half the width (45 mm.) of blade. Flowers in the usual racemes, bright canary-yellow, becoming orange in fading; sepals about 12 mm. long, narrow, parallel-sided; petals about 11 mm long, of which 4 mm. is the lanceolate blade; claw hairy on inner face; filaments perfectly glabrous; pods long-stipitate, arcuate.

Edith, Kansas, May, 1920 (*Rowena Kesler*).

Type in U. S. National Museum; part of same in New York Botanical Garden.

T. D. A. Cockerell

REVIEWS

Henry and Flood's The Douglas Firs*

The Douglas spruce has always been regarded as a variable species and many have wondered if not more than one species have been included under that name. It is therefore very interesting to know that this problem has been taken up lately and been attacked from more than one standpoint, the gross anatomy of the branches, leaves and fruit, but a comparison has also been made as to the difference in odor, minute anatomy of the leaves and chemical composition of the oil distilled from the leaves.

The authors admit three species and one variety native to North America and four species native to China and Japan. The North American species, which interest us most, are distinguished as follows:

"1. *P. Douglasii* Carrièrre. Pacific coast region of North America. Branchlets pubescent. Leaves thin, flat beneath, with pineapple odor. Cones 3 to 4 inches long, with straight erect bracts.

"var. *caesia* Schwerin. Northern Rocky Mountains. This differs from the type in the glabrous branchlets, the thicker needles and smaller cones, 2½ inches long.

* Augustine Henry and Margaret G. Flood, Proc. Royal Irish Acad. **35**: Sect. B: 67–92. *pl. 12–14.* My 1920.

"2. *P. glauca* Mayr. Rocky Mountains, Colorado to Mexico. Branchlets variable in pubescence, often glaucous. Leaves thick, rounded beneath, with strong turpentine odor. Cones 2 to 3 inches long, with reflexed bracts.

"3. *P. macrocarpa* Mayr. Southern California. Branchlets variable in pubescence. Leaves thin, flat beneath, ending in a cartilaginous point. Cones very large, 3½ to 7 inches long, with erect straight bracts."

Of these *P. macrocarpa* has generally been admitted as a good species. The Pacific coast tree, *P. Douglasii* or *P. mucronata* proper, as far as it is represented in the herbarium of the New York Botanical Garden, holds its characters very well. It may be added that the bracts are comparatively longer and narrower than in the Rocky Mountain species so that the lateral lobes extend to or beyond the cone scales. All our specimens from Eastern British Columbia, northern Idaho, northwestern Montana and southeastern Washington agree with var. *caesia,* but those of the Blue Mountain region of Oregon are variable, the cones and their bracts mostly as in the variety, but the cones in some are somewhat larger and the twigs somewhat pubescent in others. Our specimens from southern Wyoming, Colorado, Utah, Arizona, New Mexico and northern Mexico agree with *P. glauca*, the branches being mostly more or less pubescent, though in a few practically glabrous. In three specimens from New Mexico and Arizona, the bracts are not reflexed, but unfortunately all these are rather young, and the bracts may not become reflexed except in age. In the Yellowstone Park and northern Wyoming, the var. *caesia* and *P. glauca* seem to be mixed and intergrading. To the reviewer it seems as if the West Coast tree, *P. mucronata* were rather distinct, but that the var. *caesia* were more related to *P. glauca* than to *P. mucronata*. The authors do not mention anything concerning the odor of the leaves of the var. *caesia* nor of the composition of its oil. To the reviewer it seems more logical to regard even this as a distinct species or else regard all three as geographical varieties of one. A fourth species or variety may be represented by the specimens

collected in south central Mexico, at Moran, Mexico, by Hartweg and at Real del Monte, Hidalgo, by Ehrenberg.

P. A. Rydberg

Pellett's American Honey Plants*

Coming at a time when the earth's entire population is experiencing considerable anxiety over the sugar famine and our attention is naturally directed to logical substitutes for sweets and their source, this book on American Honey Plants has a peculiar and timely interest.

The 800,000 beekeepers of the United States are fortunate in having as one of their number a man possessing the combination of a thorough knowledge of apiculture and of nectar-producing and pollen-producing plants. This happy combination has made possible a convenient and exhaustive reference book. The approximately 900 plants in many genera, described as of some value because of nectar or pollen production are arranged alphabetically by common names with numerous cross references, Latin names accompanying the vernacular.

Frank Stoll

PROCEEDINGS OF THE CLUB

March 9, 1920

The first meeting of the Club for March was held at the American Museum of Natural History.

President Richards presided. There were 18 persons present.

No business was transacted.

Dr. W. A. Setchell of the University of California gave an illustrated paper on "Aboriginal Tobaccos."

The various species of *Nicotiana* used by the tribes of American Indians were discussed. Different methods of smoking were and still are in use, but in all cases the leaves of the plant is the portion used. Evidence suggests the use of as many as fourteen

* Pellett, Frank C., American Honey Plants, together with those which are of special value to the beekeeper as sources of pollen. Pp. 1–297 + figs. 1–155. Published by American Bee Journal, Hamilton, Ill., 1920.

species, tobacco-culture having extended from Washington and southern Canada to Chile. At present 8 species appear to be used by Indians:

1. *Nicotiana Tabacum.* This, the one species now commercially cultivated, was originally grown throughout eastern South America and northward to Mexico. It has formed a large number of varieties.

2. *Nicotiana rustica.* This species was cultivated extensively throughout North America east of the Great Plains and western highlands. It was early carried to the Old World, and is still cultivated there in the Levant and Persia. The species, like some others of the genus, is unknown wild, but must be of American origin.

3. *Nicotiana Bigelovii.* Probably used by Indians in California.

4. *Nicotiana multivalvis.* Used by Indians in the region of the Columbia River. A cultivated and quite unusual species, as is shown by the capsule being many-celled instead of two-celled.

5. *Nicotiana quadrivalvis.* A relative of the Pacific coast *Bigelovii* and *multivalvis,* but occurring east of the Rockies along the valley of the upper Missouri. Also an unusual species with a several-celled capsule. Doubtless of Pacific origin and carried eastward along old routes of Indian trade.

6. *Nicotiana attenuata.* The species used by the Indians of the Great Plains from Saskatchewan to Texas.

7. *Nicotiana Clevelandii.* A species of southern California, probably used by the Indians.

8. *Nicotiana trigonophylla.* A species occurring from western Texas to southern California, and used probably at least by the Apache Indians.

Beside discussing the relationship and distribution of these species, the speaker gave many historical details, touching upon Indian customs. He was emphatic in stating that, both from cultural as from purely botanical premises, the genus *Nicotiana,* excepting two unique endemic species of Australia, is wholly of American origin. The wide extent of its use, the number of species domesticated, and the occurrence of some which appear

to be products of cultivation, all point to the antiquity of its culture by the Amerinds. Francis W. Pennell,

Secretary

NEWS ITEMS

Dr. Frank Shipley Collins, of North Eastham, Mass., for many years a resident of Malden, died suddenly on May 25, at New Haven, Connecticut, in the seventy-third year of his age. Mr. Collins was one of the best-known writers on the American algae, having begun his special studies of this group of plants in early manhood, as a diversion from the cares of business, and continuing them as an avocation with remarkable zeal and success. Perhaps the first of his contributions to the literature of the algae was a note published in the *Bulletin of the Torrey Botanical Club* in 1880. His two most important works were "The Green Algae of North America," published in 1909, with supplements in 1912 and 1918, and, with Dr. A. B. Hervey, "The Algae of Bermuda," published in 1917. At the time of his death he had nearly ready for publication a paper on the algae of the Philippine Islands and had projected also a manual of the marine algae of the northeastern coast of the United States. In association with Professor William A. Setchell and with the late Isaac Holden he issued the "Phycotheca Boreali-Americana," a collection of dried specimens of the algae of North America, which had reached a total of 2,400 numbers, a total only slightly exceeded by Rabenhorst's Die Algen Europa's, the only other series of algae exsiccatae that ever approached the Phycotheca in magnitude. The passing of Farlow and of Collins leaves a wide gap in the never too crowded ranks of the American students of the algae. [M. A. H.]

Professor Raymond J. Pool was engaged for the growing season upon a piece of industrial research in Salt Lake City in connection with certain litigation which is of long standing and in which a number of smelting companies, as well as all of the inhabitants, are interested. A commission composed of chemists, chemical engineers and botanists were at work under the direction of a Commissioner appointed by the Federal Court.

The Torrey Botanical Club

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OF THE

TORREY BOTANICAL CLUB

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A monthly journal devoted to general botany, established 1870. Vol. 46 published in 1919, contained 502 pages of text and 19 full-page plates. Price $4.00 per annum. For Europe, 18 shillings. Dulau & Co., 47 Soho Square, London, are, agents for England.

Of former volumes, only 24–46 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–46 three dollars each.

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(3) The Preliminary Catalogue of Anthophyta and Pteridophyta reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

DR. FRANCIS W. PENNELL
2764 Creston Avenue
New York City

Vol. 20 November–December, 1920 No. 6

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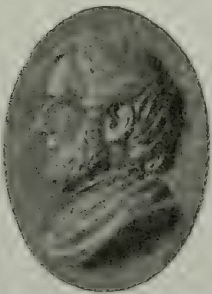
EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR



JOHN TORREY, 1796–1873.

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PELORIA IN VIOLA PRIMULAEFOLIA LINN.

By L. R. Detjen

Peloria in Viola is not a new phenomenon. It was recorded as early as 1775 when Leers* described his observations on plants of *Viola odorata*. A few years later M. Colladon-Martin† recorded a similar observation in *Viola hirta*. Both of these violet species happen to be European forms. Apparently no American species has ever been recorded producing this singular phenomenon, notwithstanding the existing great wealth of varieties and diversity of environmental conditions on the American continent.

Peloric flowers in *Viola* have been described as being of two forms, viz., those that are complete in their transformation and those that are incomplete, but as no mention was made of any other teratological phenomena being correlated with the change in the form of the flowers, we assume that those specimens that were reported represent merely cases of simple peloria.

An unusually interesting case of peloria was discovered in a *Viola primulaefolia* Linn. plant in 1912 which not only produced flowers with all of the various forms of peloria represented but in addition and correlated with this phenomenon appeared a radical change in the type of the flowers, viz., one of a general reduction and a tendency toward a numerical uniformity in the constituent parts of all of the floral whorls. The normal violet flower, as is well known, consists essentially of five sepals, five petals, a five stamen androecium and a three carpellary pistil, while the flower of this newly discovered plant in its extreme peloric form consists of a four-parted calyx, a four-

* Flor. herborn., p. 145.

† D. C. Organ. veget., t. 1, p. 519, pl. XLV.

[No. 5, Vol. 20 of Torreya, comprising pp. 91–106, was issued 12 November, 1920.]

parted corolla, a four-parted androecium, and a four carpellary pistil. Thus the typical form of the violet flower has been changed to one that is not only perfectly regular but also uniform in all of its parts.

FIG. 1. A plant of *Viola primulaefolia* Linn. bearing the modified flowers.

The original plant bearing these unique flowers was discovered in May, 1912, on the bank of Rocky Branch at West Raleigh, North Carolina, and it proved to be the only plant, among hundreds of others of the same species, that exhibited this peculiarity. Most of the flowers were peloric in form but the majority of them were of the incomplete type. The evidence then at hand suggested that a new regular violet flower, one

composed of four sepals, four petals, four stamens and four carpels, was in the process of formation. Such flowers have later been obtained and a truly new type of violet realized.

A detailed description of the normal violet flower together with a brief description of the complete and incomplete peloric forms and their correlation with other characters will now be given.

Description of the Normal Violet Flower

The normal violet flower is too well known to warrant a detailed description. However, for the sake of comparison with those of the peloric types, the essential characters will be briefly mentioned.

The calyx is composed of five sepals, three of which are plainly auricled. The corolla is composed of one saccate or spur bearing petal, which normally is situated at the base of the flower, and four others which are non-saccate. In addition to the saccate character, this petal is easily distinguished by its long and distinct, dark purplish inner striations. The androecium is composed of five stamens each of which bears a pair of anther-sacs. Only two stamens of the set of five bear a stamen-appendage. They are located one on each side of the saccate petal and the two appendages are enclosed in the one sac. The pistil is composed of three carpels with as many placentae to which the ovules are attached. The style has a decided dorso-ventral curvature immediately above the ovary and its gradual upward dilation ultimately forms the stigma. The pore-tube slants at a decidedly sharp angle with the longitudinal axis of the style.

These are the characters of the normal flower of *Viola primulaefolia* Linn. and are enumerated at this time merely for the sake of a contrast with similar ones found in the various peloric forms.

Description of the Complete Peloric Flowers and their Correlations

In view of the fact that two wonderful changes are taking place in the flowers of this violet plant, it might be well to repeat

that the phenomenon of peloria in *Viola primulaefolia* as described in this paper seems to involve not only a transformation of the irregular or unsymmetrical flower to one that is regular or symmetrical with respect to the transverse diameter of the

FIG. 2. A handful of violet flowers gathered from the new strain of *Viola primulaefolia*. Notice the variations in the numbers and positions of the saccate petals.

peduncle but also a reduction in the number of component parts of all of the floral envelopes, except the pistil, in which case the number is definitely increased. Therefore, the peloric flowers which are complete in their transformation including the changes resulting in the uniformity in numbers of the constituent parts of the floral whorls, may be described thus:

The calyx is composed of four equal sepals all of which are plainly auricled. The corolla is similarly composed of four equal petals all of which are saccate and true spur-petals in every essential including the interior striations. The androecium is composed of four stamens, each of which bears a pair of anther-sacs and one appendage. It is also noteworthy to mention that of the four sacs of the corolla, one encloses two stamen-appendages, or one from each of the two adjacent stamens, two enclose one appendage each and one apparently does not enclose any. The carpels are four in number with four equally developed placentae. The style immediately above the ovary is practically straight and a distinct dilated stigma with two lobes is formed at its distal extremity. The beak or pore-tube is situated in the center of the stigma and its longitudinal axis is in the same plane as that of the style. The opening of the pore-tube, instead of being circular in outline, is represented by what might be called an oblong orifice whose greater diameter lies at right-angles to that of the stigmatic lobes.

While this fully developed type of flower represents the extreme of variation, it is represented, in this case at least, in but a small percentage of the flowers.

Description of Intermediate Types of Flowers

The intermediate flower types are quite variable and are represented by an infinite number of forms with respect to the number and arrangement of their constituent parts. They apparently form a complete series from that of the normal flower to that of the extreme peloric type. In the spring of 1920 a total of 573 flowers were picked quite at random and a study of these gave the following ratios: no saccate petals—0 flowers, one saccate petal—203 flowers, two saccate petals—157 flowers, three saccate petals—128 flowers, four saccate petals—84 flowers, and five saccate petals—1 flower. A number of these flowers have been dissected and critically studied and as a result of the analyses it becomes possible to make the following deductions.

1. Each of the floral whorls may exhibit modifications inde-

pendent to some extent of the other whorls. For instance, we find flowers with four sepals, five petals, five stamens and three carpels; four sepals, four petals, five stamens and four carpels; four sepals, five petals, five stamens and four carpels; or such an arrangement as, five sepals, five petals, three stamens, and three carpels, and so on.

2. The constituent parts of the floral whorls may be modified independently of one another. Thus we find three or four sepals plainly auricled whenever five constitute the calyx, but when four or a less number of sepals constitute the calyx all of them are so auricled. One case was studied where five sepals were present and all of them were plainly auricled, another case where only three sepals constituted the calyx and all of them were so auricled.

In the corolla we find either one, two, three, four or even five petals saccate whenever five constitute the whorl. When only four petals are present all are saccate. Frequently petals are found that might be termed intermediate between the non-saccate and those that are plainly saccate. Normally the saccate petal in *Viola* is situated at the base of the flower but in this new type it may be found in the place of any one of the five petals, that is, on any one side of the flower. Whenever two or more saccate petals are present they may be found in any of the five different positions. Four saccate petals are usually found located opposite one another, thus forming a perfect square.

Among the stamens we find two, three or four that are appendaged whenever five constitute the androecium. Whenever four or a less number are present all of them usually are appendaged. It might be stated in this connection that the spur of generally one, sometimes two, saccate petals encloses one appendage of each of the two adjacent stamens. Again, all of the stamens may bear twin anther-sacs or, for instance, whenever four stamens constitute the androecium, one or two individuals may bear triple anther-sacs. A case of this kind was observed where two of the four stamens had three anther-sacs each and were situated on opposite sides of the androecium. Other cases were observed where only one of a set of four stamens had

the triple anther-sacs and two cases where but three stamens constituted the androecium. In these latter cases one of the three stamens bore the normal twin and the other two the triple anther-sacs. Again, two, three or four stamens may bear single

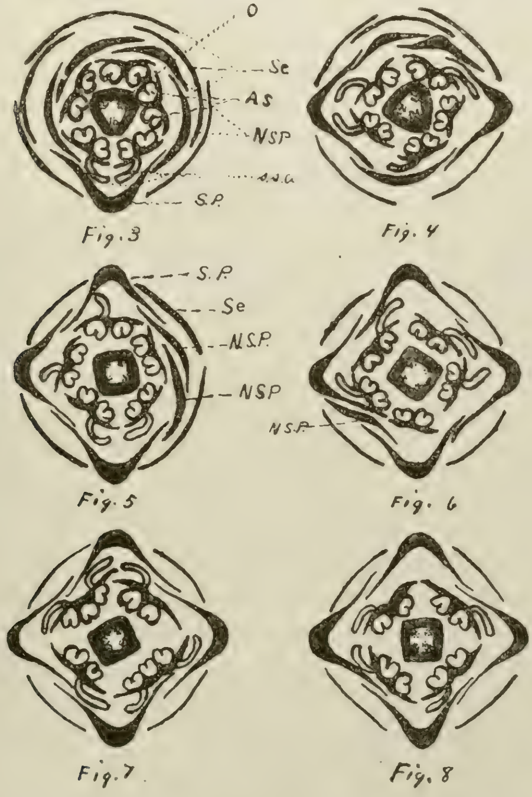

FIG. 3–9 incl. represent sketches of cross-sections of some of the modified flowers. Se., sepals; S. P., saccate petals; N. S. P., non-saccate petals; Tw. A. S. twin anther-sac stamen; Tr. A. S., triple anther-sac stamen; A. S., anther-sacs; s. s. a., single stamen appendage; t. s. a., twin stamen appendages; O., ovary with its placentae and ovules.

appendages or as in the case of the stamens that bear the triple anther-sacs, one or more may bear twin appendages.

The ovary may be composed of three or four carpels. The fourth carpel is often found in various stages of development.

3. A certain amount of correlation or interdependence seem-

ingly exists between the character and position of some of the constituent parts of one floral whorl and those of other whorls within the same flower. For instance, the saccate petal usually is correlated with an appendage affixed to one of the adjacent stamens; and the size of the sac seems correlated with the size and development of the enclosed appendages. Apparently an exception to this rule is found within the extreme peloric flowers where one saccate petal is regularly seemingly unaccompanied by the usually inclosed stamen appendage.

Another correlation that might be mentioned is one existing between the number of stamen appendages and the type of stamen; for instance, the twin appendages are always associated with the triple anther-sac stamen but these in turn need not always bear the twin appendages.

Inheritance of Peloria and the Tendency toward Numerical Uniformity in the Floral Whorls in Viola primulaefolia

As soon as the plant bearing peloric flowers was discovered it was transplanted to a more suitable field where it continued to grow and develop seed. Some of the seeds were saved and planted in a flat where they germinated early in 1913. Sixteen plants were secured and later transplanted to an open field where they bloomed the following year. All of these plants produced flowers similar to those of the parent plant. The sixteen plants soon began to multiply by means of stolons and soon a patch or a solid mat of plants was formed. All of the plants originating from stolons also produced flowers quite similar to those of the parent plants. From time to time the matted patch was thinned of its superfluous and older plants and still the newest plants, even after a lapse of seven seasons, continued to produce flowers like those of the original plants.

Effect of Environment on Peloria and the Tendency toward Numerical Uniformity in the Floral Whorls

Plants of this unique strain have been grown in a number of different places and under a variety of conditions for the purpose

of ascertaining what effect environment might have on the form of the flowers. Individual plants, in early spring and before much growth had taken place, were potted in good garden soil and grown indoors like ordinary house plants, others were bedded in similar soil supplied with a generous amount of fertil-

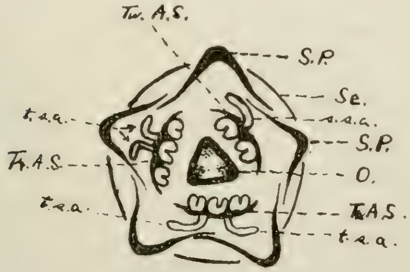

Fig. 9

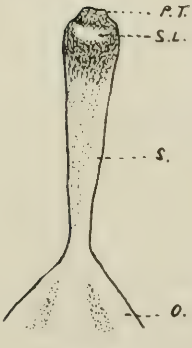

Fig. 10

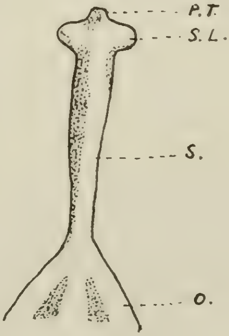

Fig. 11.

FIG. 10 represents the style and stigma from a complete peloric flower, side view. P. T., pore-tube; S. L., stigmatic lobe; S., style; O., ovary. Fig. 11 represents the same style and stigma from a front view.

izing constituents and grown under greenhouse conditions and still others were grown in the muck soil of a damp or swampy area in the open field. The results in all cases were alike, all of the plants without exception produced the previously described peculiar flowers.

A Few General Remarks

The outstanding features of this new strain of *Viola* are:

1. It produces variable flowers which exemplify the connecting link between a 5-merous and a 4-merous flower.

2. It embodies the phenomenon of peloria which changes the flower from an unsymmetrical one to one that is perfectly symmetrical.

3. With respect to (1) and (2) it remains uniform under great differences of environment.

4. It apparently breeds true to type both vegetatively and sexually.

5. Because of (4) it might be truly termed a mutation.

Other generations of this interesting strain of violets will be grown and reported on as time will permit but since the seeds are borne in capsules of cleistogamous flowers they might be considered the result of self-fertilization and therefore succeeding generations might not differ materially from the first unless the strain throws other mutations.

AN EXCURSION TO MOUNTAIN LAKE, VIRGINIA

By William Alphonso Murrill

Our party of six left Blacksburg, Virginia, for Mountain Lake at seven o'clock on the morning of July 22, 1920, prepared to spend the day. Clear weather had succeeded a season of rain and the hay-makers were busy in the fields along the road as we passed, while the oat crop stood ready for harvesting. Nature had not been stingy in any particular; everything planted in gardens and fields was growing and yielding most bountifully, while the last raspberries and dewberries and the first of the blackberries indicated an unusual abundance of wild food.

The first range we climbed and crossed was Brush Mountain, whose southern flank was covered with stunted pitch pine, bracken fern, sweet fern, and a wealth of *Coreopsis senifolia*, with attractive yellow flowers and leaves arranged in whorls of sixes. From Brush Mountain to Gap Mountain was only a few minutes' ride, across a narrow stretch of sterile land very

appropriately named Poverty Valley. By the roadside in the "Gap" was a spring of cool water and the hay-scented fern, *Dicksonia*, grew there in abundance. Nestled in a deep cove beyond Gap Mountain was the village of Newport, eight miles from Blacksburg and just halfway to Mountain Lake. After negotiating the steep hill to the north of Newport and crossing Sinking Creek, we were at the base of Salt Pond Mountain, with six miles of tortuous and rather rough climbing ahead of us. Our attention, however, became more and more directed to the increasing magnificence of the view and the successive changes in the character of the vegetation as we climbed from an elevation of 1,800 to one of 4,500 feet above the sea.

Along the road near the foot of the mountain, the common milkweed and the butterfly weed, with orange-colored flowers, bloomed profusely, interspersed with the blue, star-shaped flowers of the cultivated chicory, which has become very common in many parts of Virginia. In one of the hollows, a large clump of pale jewel-weed, *Impatiens pallida*, was seen in full flower. The most abundant weed at the lower elevations was *Actinomeris squarrosa*, often called "river-weed," which was easily recognized without flowers by its square, winged stem. As we approached the upper part of the mountain, after rounding the long curve that brought the valley of New River into view, the scarlet flowers of the fire pink, *Silene virginica*, gleamed from the rocky banks and large groves of chestnut trees in full flower indicated a bountiful crop of nuts, unaffected as yet by the canker.

Near the lake, we halted at the famous cold spring for a drink and then went on to the hotel, which is situated at the southern end of the lake, 4,000 feet above sea-level, with Bald Knob rising behind it 500 feet more. Sunset Hill lies to the westward, —famous for a large deposit of marine Devonian fossils and for its fine view. A thicket of common hazelnut bushes crowned this little eminence, with gooseberry bushes growing near. The beaked hazelnut, *Corylus rostrata*, is quite common on the northern flank of Bald Knob some distance above the hotel. The blueberry fruits were just beginning to ripen at this elevation, while the shin-leaf, *Pyrola americana*, was in flower and

the hay-scented fern, *Dicksonia punctilobula*, which is very abundant at Mountain Lake, was in full foliage with numerous young sporangia.

The margin of the lake was fringed with a dense thicket of *Rhododendron maximum* in full flower, and in the moist leaf-mold beneath the rhododendrons a number of brilliantly colored mushrooms grew. Near the spring on the right was a bed of *Oxalis Acetosella*, while nearby were several large trees of *Ilex monticola* and *Betula alleghaniensis*, the latter bearing black, aborted forms of *Pyropolyporus igniarius* similar to those found commonly on yellow birch in New England. I looked for *Parnassia* but could not find it; then my attention was attracted to a pretty shadbush loaded with fruits, some of which were ripe.

At the lower end of the lake, a species of skullcap,—either *Scutellaria nervosa* or *S. pilosa*,—was abundant, covered with small blue flowers. Nearby, in the leaf-mold, I found an insect-eating fungus, *Cordyceps militaris*, growing on the pupa of the same insect which I found so commonly attacked by it in the mountains of western North Carolina. A beautiful specimen of the mountain silver-spot butterfly, *Argynnis cybele*, hovered near; but *A. diana* was not seen during the entire journey, although the males should have been on the wing by that time.

Field notes were made on many of the flowering plants seen, as well as on the fungi (which have been listed in *Mycologia*). In addition to those already mentioned, the following might be of interest:

Herbaceous Plants

Arisaema triphyllum, just passing out of flower; *Clintonia umbellata*, in leaf; *Trillium grandiflorum*, in leaf; *Unifolium canadense*, in fruit; *Apocynum androsaemifolium*, in flower; *Baptisia tinctoria*, so much used to keep flies from horses' heads, in flower; *Collinsonia canadensis*, in leaf; *Dalibarda repens*, so often mistaken for an evergreen violet, in leaf; *Dianthus Armeria*, in flower; *Echium vulgare*, very common at lower elevations, in flower; *Epigaea repens*, in leaf; *Galax aphylla*, more common on Brush Mountain, in fruit; *Gaultheria procumbens*, in flower; *Hydatica petiolaris*, a rare saxifrage abundant every season among the rocks on top of Bald Knob, in flower; *Lysimachia quadrifolia*, in flower; *Monarda fistulosa*, in flower; *Monotropa uniflora*, in flower and fruit; *Prunella vulgaris*, in flower; *Saponaria officinalis*, in flower; *Therofon aconitifolium*, on Bald Knob, in flower; and *Verbascum Thapsus*, in flower.

Shrubs

Azalea nudiflora, in leaf; *Ceanothus americanus*, very abundant on Brush Mountain, in flower; *Comptonia peregrina*, also more common on Brush Mountain, in leaf; *Gaylussacia baccata*, in fruit; *Kalmia latifolia*, in fruit, *Oxycoccus erythrocarpus*, on Bald Knob; *Rosa virginiana*, in flower; *Rubus odoratus*, in flower; *Sambucus canadensis*, near the Cascade, in fruit; and *Viburnum alnifolium*, in fruit.

Trees

Acer pennsylvanicum, *A. rubrum*, *A. saccharinum*, and *A. saccharum; Alnus rugosa; Carpinus caroliniana; Celtis occidentalis; Cynxoylon floridum; Fagus grandifolia; Fraxinus americana; Hamamelis virginiana; Hicoria glabra* and *H. ovata; Juglans cinerea* and *J. nigra; Juniperinus virginiana; Liriodendron Tulipifera; Magnolia acuminata; Nyssa sylvatica; Oxydendrum arboreum*, in flower; *Pinus rigida* and *P. Strobus; Prunus americana; Quercus alba, Q. coccinea, Q. palustris, Q. Prinus, Q. rubra*, and *Q. velutina; Robinia Pseudo-Acacia*, badly attacked by *Fulvifomes Robiniae; Sassafras Sassafras; Sorbus americana*, on Bald Knob; *Tilia americana, in* flower; *Tsuga canadensis*; and *Ulmus americana*.

As may be judged from the above account, the flora of Mountain Lake is similar to that described in Torreya a few years ago for Apple Orchard Mountain in the Blue Ridge, but the Carolina rhododendron and a few other striking elements are absent.

W. A. Murrill

NOTES ON SCLEROPOA

By J. C. Nelson

At the end of a rambling series of notes on "Some Oregon Exotics" in the American Botanist for November, 1918 (24: 129), attention was called to the discovery of *Scleropoa rigida* (L.) Griseb. at Salem, Oregon in May, 1917. Since the plants found at that time were growing precariously in the crevices of an old brick building in the business district, and were looked upon with extreme disfavor by the street-commissioner, it did not seem prudent to regard the species as a permanent addition to our flora. Since that time the building has been changed from a junk-shop to an automobile-station, and an attempt has been made to eradicate the weeds by which it was originally surrounded and restore the neglected street-parking; but in spite of all these "improvements" the grass has stubbornly reappeared each season, and this year (1920) has established itself profusely

in the parking adjacent to the building. Since it matures abundant seed very early, before the dry season sets in, it seems not unreasonable to suppose that we may begin to number it among our permanent grass-population.

As this is undoubtedly the first record of *Scleropoa* in Oregon, I have made some effort to determine to what extent it has appeared elsewhere in the United States. An examination of our three largest herbaria—the National, the Gray, and the New York Botanical Garden, shows a representation outside of Oregon as follows:

Alabama

Fort Morgan, S. M. Tracy, Apr. 27, 1901 (Nat.)

Fort Morgan, S. M. Tracy, Apr. 27, 1901 (Gray)

Fort Morgan, collector not stated, (N.Y.)

Mobile, "Ballast-grounds," Chas. Mohr, June 28, 1885 (Nat.)

Mobile, "Ballast-grounds," Chas. Mohr, No. 5 (Nat.)

Florida

Apalachicola, "Wharves," Chapman (Nat.)

Apalachicola, "Streets," Geo. Thurber (Gray)

Massachusetts

Boston, C. E. Perkins, July 17, 1878 (Nat.)

South Dakota

Brookings, Matt. Fowlds, July, 1917 (Nat.)

It will be observed that most of these labels are rather imperfectly provided with data as to date and habitat, but the Boston specimen would appear to be the earliest collection, and with the exception of the Brookings plant, all the recorded specimens are from localities on or very near the coast, clearly indicating a foreign origin. Since the South Dakota station is in such marked contrast to the others, I have asked Professor Fowlds, in charge of the Seed Laboratory at the South Dakota Agricultural Experiment Station, to give me the circumstances under which the grass was first collected. He writes:

"In 1915 a grass-garden was established at this station. Many of the grass-samples for this purpose were secured for us by a seedhouse. Some of these samples came from various points in Europe. The *Scleropoa rigida* occurred as an impurity in one of these samples. We have no means of knowing where the sample originated. Only one plant of this grass appeared, but the seed was collected and the grass propagated for a year or two. This grass can be propagated only with difficulty and never gave evidence of persisting on its own account. Several specimens of this plant have been preserved in our herbarium."

It is evident from the above that the Brookings plant never rose above the status of a waif, and could not be regarded as a part of the local flora. The station at Salem seems therefore to represent the farthest point inland at which the grass has established itself in the United States. How it came here remains unexplained, as there does not appear to have been any storage of foreign goods in the building where it was first found.

The European native range of the grass seems to be limited to the Mediterranean region from southern France to Montenegro, with an outlying area in Belgium; but it has spread widely through southern and central Europe as a naturalized plant, according to Hackel even reaching England.

In general habit the grass attracts instant notice by its very rigid open panicle, which suggests that of *Festuca elatior* on a small scale, but with a stiff, unyielding effect which gives a certain resemblance to the fertile frond of various dimorphic ferns (*e.g.*, *Cryptogramma acrostichoides*). In general it would be taken for a *Festuca* by one encountering it for the first time; and as a matter of fact, the genus stands taxonomically very close to *Festuca*, from which it appears to differ chiefly in its punctiform hilum. Its exact relationship has been a matter of very various interpretation. Linnaeus, who first described it (Cent. Pl. 1: 5. 1755) placed it in *Poa*. There is no evidence that he had a specimen before him, and his description appears to be based on a plate by Vaillant. Beauvois (Agrost. 167, 175. 1812) transferred the species to *Megastachya*, a genus no longer maintained; Link (Enum. 1: 90. 1821) placed it in *Sclerochloa*,

now regarded as a monotypic genus consisting of *S. dura* Beauv.; Smith (Engl. Fl. **1**: 119. 1824) regarded it as a *Glyceria;* and Kunth (Rev. Gram. **1**: 129. 1829) very tardily recognized the relationship to *Festuca* by placing it in that genus.

The genus *Scleropoa* was finally established by Grisebach (Spic. Fl. Rumel. **2**: 431. 1845) and was made to include but the one species *S. rigida*. Since that time various concepts of the genus have prevailed. Parlatore in 1848 recognized seven Italian species. Boissier in 1884 recognized seven species in his Flora Orientalis. Twelve binomials are given under *Scleropoa* in the Index Kewensis. Hackel (in Engler & Prantl, Nat. Pflanzenfam. **2**: 2, 75. 1887) states that there are "2 Arten," and names *S. rigida*. What he regards as the second one cannot be conjectured with certainty, although of the various species that have been proposed *S. Hemipoa* (Delile) Parl. (Fl. Ital. **1**: 472. 1848), a native of Sicily, would seem to have perhaps the best claim to validity.

I am under obligation to Dr. J. H. Barnhart for compiling and verifying the bibliography of *Scleropoa*, and to Prof. A. S. Hitchcock, Dr. J. K. Small, Mr. J. F. Macbride and Prof. Matthew Fowlds for their information regarding herbarium specimens. Duplicates of my own collection have been deposited in each of the three large herbaria named above.

SHORTER NOTES

A New Oregon Eucephalus. **Eucephalus vialis,** sp. nov.—Stems slender, light green, about 12 dm. high, furnished with a glandular pubescence; leaves thin ovate-lanceolate, sessil or nearly so: dark green above, dull beneath, but not glaucous, slightly puberulent, the upper ones in the panicle especially so, and provided with stiff hairs on the margins, which are subentire; 2–11 cm. long, 5 mm.–3 cm. wide; the lower minute, usually obtuse, the upper acuminate; inflorescence of numerous heads in a panicle, the branches of the panicle, glandular, beset with spreading hirsute pubescence; heads rather small and narrow, ordinarily 10 mm. high, but often no more than 5 mm.; bracts of the involucre in

3–4 series, usually pale and chartaceous, rarely slightly herbaceous, the lower somewhat glandular; rays none; the dull bristles of the pappus unequal and longer than the yellow tubular disk flowers; akenes oblong, flattened, and villous with somewhat appressed hairs; the style branches linear-lanceolate.

Rocky hillsides, Eugene, Oregon. *Bradshaw* no. 1944 (the type); no. 1885; and no. 1914 (in the U. S. National Herbarium). The duplicate of the type is to be placed there also. *Cusick* (as E. Engelmannii), rocky hillsides, Willamette Valley.

This species first came to my attention three years ago, when I thought it was an *Aster.* Since them I have come to the conclusion that it belongs to the genus, *Eucephalus* and that it is very closely related to *E. Engelmanni.* It seems to be nearer to that species than to any of the others. The differences, however, between it and that species are very evident, even from a casual study. The general appearance is very similar. The stems and leaves are of the same color; but the stems of *E. Englemannii* are much more glabrous, and the leaves somewhat broader. The heads of *E. vialis* are smaller and more narrow than those of *E. Engelmannii;* the former never has rays, and the bracts of the involucre are more narrow and pale than in the latter. The bracts of the latter do not seem to be so glandular. From my observation, *E. vialis* is a plant of the lower hills, while *E. Engelmannii* is one of the mountains.

My first specimens were obtained on Skinner's Butte which is situated between the city of Eugene and the Willamette river, both being just north of Eugene. In the open woods at the summit, under the Douglas firs, the species is not uncommon. Some six miles south of Eugene, on the base of Spencer's Butte, in similar locations, I have collected it this summer.

This proposed species is so named, due to the fact that all my collections were made from plants that were growing about paths and roads either in open wooded areas or along the banks facing the Willamette river.—R. V. BRADSHAW.

EUGENE, OREGON.

REVIEWS

Britton and Millspaugh's Bahama Flora*

For nearly twenty years the authors of this volume or their immediate associates and predecessors have carried on one of the most exhaustive botanical exploration schemes ever planned. Covering more than 29 islands, 661 cays and hundreds of smaller rocky points in the sea, their explorations have been very thorough. The islands are scattered on a long axis of over 600 miles, and comprise in all about 4,400 square miles. Surrounded by considerable depths, "there is no evidence that there ever was land connection with either Florida, Cuba or Hispaniola," although some of the present islands may have been connected.

This group of islands, none over 200 feet above sea-level, contains 995 Spermatophyta, 33 ferns and their allies, and the mosses, fungi, lichens and algae bring the total up to 1,982 species. Of these 133 are endemic flowering plants, and 52 species of non-vascular cryptogams are also endemic. A single species of *Marsilea, M. Nashii* is said to be endemic on page 475, although the authors do not credit the Pteridophytes with any endemics in the table of these in the Introduction.

In such a purely insular flora the proportion of woody to herbaceous endemic species is interesting as it has been recently much under discussion. In the Bahamas woody endemics total 76, herbaceous 53 and parasites 3. Of these the Euphorbiaceae with 15 endemic species, contain a larger number of endemics than any other family on the island. More will be said as to this endemic element of the Bahama Flora in another place as it appears to throw considerable light on the age and area theory of J. C. Willis.

Like the series of manuals which the senior author has already issued, or are in preparation, the present volume is carefully keyed, both as to genera and species; and there are keys to the families. With descriptions of the genera and species, and a citation to place of original publication the book is as complete as one could demand. Due to the mistakes of earlier explorers

* Britton, N. L., and Millspaugh, C. F., The Bahama Flora, pp. i–viii, 1–695. Published by the Authors, New York, 26 June, 1920. Price $6.25.

and the inevitable mixing up of old collections and names, the present volume which for the first time untangles all these threads, makes it possible to know what grows in the Bahamas. To the tourist and traveller the book is invaluable, and it deserves the wide usefulness it will undoubtedly enjoy.—NORMAN TAYLOR.

Small's Origin and Development of the Compositae*

This interesting comparative study was continued through ten years. The main conclusion is that the basal form of the great Composite family is the genus *Senecio*, and that this in turn has been derived from the *Lobelioideae*. The aim has been to present a coherent account of the family considered as a whole. The fourteen chapters, each followed by a bibliography, are: (1) History of the Classification of Compositae, (2) The Pollen-Presentation Mechanism, (3) Its Irritability, (4) Corolla, (5) Pappus, (6) Involucre, (7) Receptacle, (8) Phyllotaxis, (9) Fruit Dispersal, (10) Geographical Distribution, (11) Origin, (12) Miscellaneous, (13) General Conclusion, (14) Story of the Compositae in Time and Space.

The accompanying diagram is an abbreviated form of that given under "Phyletic conclusions." While the usual tribes are kept up reasons are given for separating *Gnaphalium* and related genera from the *Inula* group, now classed together as *Inuleae*. The naturalness of the *Helenieae* is also questioned. The interpretation of pappus as a divided calyx is shown to be misleading; it can only be explained as a trichome structure. Throughout the work geographic distribution is considered in connection with morphology.

"With a little mental effort and a little study of Bergson the student may be able to perceive plants of the Andean *Lobelioideae*, such as *Siphocampylos-Centropogon*, change into *Senecio*." The views of Bergson are thus interpreted: the smooth-flowing stretches of a river correspond to orthogenetic development; the waterfalls are saltations which give rise to the branches or back waters; the river-bed with its sinuosities is the environment. "In evolution by orthogenetic saltation, with epharmosis and

* Small, James. The Origin and Development of the Compositae. 334 pp., 40 figures and maps. New Phytologist Reprint No. 11. London, 1919.

elimination of the unfit exercising a directing and delimiting function on the actual forms assumed by organized life, we have the best of Darwinism, neo-Lamarckism, neo-vitalism, Mendelism and the mutation theory."

The Compositae appear to have been formed with and for the mountains. The facts may be explained on the theory that a yellow *Lobelioid*, starting as an arborescent scrambler

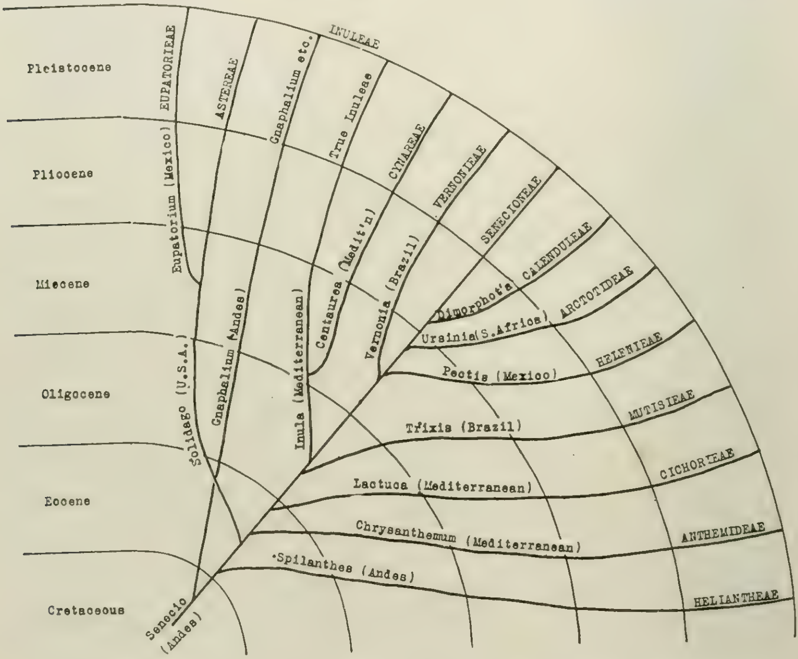

Fig. 1.—Probable evolution of the Compositae (abrikged from James Small).

about the sources of the Amazon, ascended the Andes shortly after their elevation during the cretaceous period. In the higher altitudes the plant became dwarfed, the flowers and pedicels smaller. Orthogenesis crowded the flowers closer, the anther tube became erect, only a few ovules were developed; in short there arose a form essentially like the alpine *Senecio Jacobaea*. So close is the affinity that the author must doubt the dictum of De Vries that "great lines of evolution of whole families and even of genera . . . lie outside the limits of experimental observation."—Alfred Gundersen.

Emile Duchaux's Pasteur: The History of a Mind*

A number of good biographies of Pasteur have familiarized English readers with his life and character. Here, however, another phase of his personality is presented—his mental life, written by his student and co-worker Duclaux. The author's purpose, didactic rather than purely biographical, has been to trace the working of Pasteur's mind in his conflicts with old prejudices and his pioneer development of new concepts; more particularly to show his mode of clear deductive reasoning from facts.

The book appears to have been almost unknown to American and English workers, for whom it has been translated by Smith and Hedges, with a number of interesting additions to the original. The personality of Duclaux, his life and works are described in a vivid introduction by the senior translator, who has also appended a series of brief, characterizing word portraits of persons referred to in the text, with a comprehensive index not present in the original. An unusually complete collection of photographs of Pasteur at various stages of his career has been added.

The book is divided into eight parts, and takes up Pasteur's studies on crystallography, fermentation, spontaneous generation, silkworm diseases, the etiology of microbial diseases, and his development of the concepts of viruses, vaccines and immunity. In each subject Duclaux first gives the reader a clear perspective of the state of the various current ideas and facts then known, and then discusses Pasteur's own researches and concepts—derived experimentally—and the discoveries to which they led. The controversies and discussions with contemporary workers are written in a colloquial, readable style that has been well retained in the translation. The reader is brought directly into the atmosphere of the time—its vague ideas and gropings on the threshold of a new science, which we can scarcely realize in our present development of bacteriology.

Through his close association with Pasteur, Duclaux was

* Translated by Erwin F. Smith and Florence Hedges. W. B. Saunders Company, Philadelphia.

enabled to set forth in detail the questions arising in Pasteur's mind in the course of an investigation, and his methods of answering them by experiment. It is from this standpoint particularly that the book should prove of unique value to the student taking up research in the biological sciences, who wants training in the use of the experimental method and interpretation as practiced by a scientific mind of the highest type, as well as the technique to which most research teachers are solely addicted. It has not the usual dryness of a textbook—the play of logic, suspense and triumphant experiment reads like a Dumas. Duclaux has written a most inspiring and charming book, and it would have been a loss indeed had it not been rescued and rendered available to English readers.—Harry Braun.

PROCEEDINGS OF THE CLUB

March 24, 1920

A meeting of the Club was held at the New York Botanical Garden at 3.30 p.m. Professor R. A. Harper presided. There were 19 persons present.

The minutes of the meetings held February 25 and March 10 were adopted.

Mr. Ludlow Griscom and Mr. Elba E. Watson were proposed and elected to membership.

The appointment of Dr. Michael Levine as Chairman of the Field Committee, instead of Dr. F. W. Pennell, was announced.

The scientific program consisted of a discussion by Mr. Norman Taylor of the flora of Mount Marcy, New York, above timber-line. Twice during the season of 1919 did Mr. Taylor, in coöperation with others stuying the vegetation of the state, visit the summit of Mount Marcy. Timber-line was noted at 4,300 feet altitude, and the factors controlling this were considered. Various floras occur on bog land, dry slopes, rock outcrops, etc., and a list of all species seen were made. This was compared with the list made about 1880 by the late Dr. C. F. Peck.

Only 67 species were found above timber-line, and of these

only 16 to 20 may be counted true alpines. The majority are species of the lowland which have now passed above the spruce forest.

Francis W. Pennell,
Secretary.

April 13, 1920

A meeting of the Club was held at the American Museum of Natural History at 8.15 P.M. President Richards presided. There were 18 persons present.

Mr. V. C. Dunlap, Mr. E. M. Gilbert, Miss M. B. Greenwood, Mr. T. R. Greer, Mr. G. T. Harrington, Mr. Emil Heinold, Prof. W. W. Rowlee and Mr. H. E. Stork were proposed for membership and elected.

Mr. O. F. Burger gave an account of "Spoilage of Fruits and Vegetables in Storage and Transit"; and Mr. O. F. Meier discussed "Spoilage of Vegetables." Both discussions were illustrated.

The discussions considered the organisms causing trouble, especially fungous parasites and saprophytes, and the methods of controlling these. The subject was presented in clear, non-technical terms.

Francis W. Pennell,
Secretary.

April 28, 1920

The meeting of April 28, 1920, was held in the Morphological Laboratory of the New York Botanical Garden at 3:30 P.M., with Dr. F. J. Seaver as chairman. Eleven persons were present.

Minutes of the meetings of March 24 and April 13 were read and approved.

The resignation of Mrs. T. W. Johnston was read and accepted. The acting secretary announced the death of Mr. F. W. Bruggerhof, the late president of the J. M. Thorburn & Co.

The following persons were proposed for membership and were elected subject to the approval of the committee on membership: Mrs. L. J. Gold, 263 East 197th St., New York City; Miss M. Hathaway, 110 Morningside Drive, New York City;

Dr. Claude E. O'Neal, Ohio Wesleyan University, Delaware, Ohio.

The scientific program consisted of a paper by Dr. P. A. Rydberg under title of "Rearrangement of the Genera of the Tribe Galegeae of the Family Fabaceae or Papilionaceae," of which an abstract follows:

"The tribe *Galegeae* has been divided since Bentham's time into seven subtribes. Of these *Psoralieae* was some years ago taken out as a tribe. It contains *Psoralea*, *Amorpha*, *Parosela*, *Petalostomon*, and several related genera, characterized by the foliage, which is glandular-punctate, and the pods, which are one- or few-seeded, usually indehiscent but rarely breaking open irregularly across the middle, never valvate. Another subtribe, the *Indigofereae*, should also be removed as a tribe. The genera belonging to it (of these only *Indigofera* is found in America) have three characters seldom found elsewhere in the Fabaceae, and never combined in any of the tribes of that family, viz. Malpighian hairs on the foliage, appendaged connective in the anthers, and lateral spurs on the keel-petals.

"The other five subtribes should probably remain in the *Galegeae*. Of these *Brongniartieae*, consisting the genera *Brongniartia* and *Harpolyce*, is rather natural and based on the erect, stalked, and distinctly strophiolate seeds, a character rather unusual in Fabaceae but very common in Caesalpiniaceae.

"The other four subtribes are very artificial. The *Tephrosieae* are distinguished from the rest by the terminal instead of axillary inflorescence, but the inflorescence in the principal genus *Cracca* L. (*Tephrosia* Pers.) is very variable. In about half the species the racemes are strictly terminal, but many of these species have additional axillary racemes in the upper leaf-axils. In others a bud in the uppermost leaf-axil develops into a branch which in turn produces a terminal raceme. This may be repeated several times and the several racemes appear as if opposite to the leaves. In a few species the racemes are borne obliquely, neither opposite nor exactly in the axils, and it is hard to tell if they are really terminal or axillary. The subtribe contains five genera, four native and one introduced. Of these the last,

Galega is closely related to *Cracca; Peteria* is less closely so, while neither *Barbiera* nor *Kraunhia* (*Wisteria*) should be placed in the same tribe. The presence of two bractlets under the flower would indicate that *Barbiera* is related to *Sesbania* and *Diphysa* among the *Robinieae*, although the structure of the pod is different. *Kraunhia*, notwithstanding the terminal racemes, is very closely related to *Robinia* and should either be transferred to the *Robinieae* or else form with the Asiatic genus *Millettia* another subtribe.

"The subtribe *Robinieae* is distinguished from *Coluteae* and *Astragaleae* by its one-celled, two-valved, flattened not inflated pods, but in the genus *Diphysa*, just referred to, the exocarp of the pod is inflated and forms two lateral bladders, and in *Homalobus* and *Kentrophyta*, segregates of *Astragalus*, the pod has all the characters assigned to *Robinieae*. *Robinia*, *Olneya*, *Benthamantha*, *Lennea*, *Willardia*, *Hebestigma*, *Gliricidia*, and *Poitea* form a very natural group, the true *Robinieae*, with truly axillary racemes, flat, two-valved pods and odd-pinnate leaves. *Corynella*, *Notodon*, and *Sabina* form also a group with similar pods, but the leaves are abruptly pinnate and the flowers are borne in fascicles on short leafless branches axillary to the leaves of the preceding season. *Coursetia* combines characters of the two groups, some species having odd-pinnate, others abruptly pinnate leaves. Probably these could be segregated into two genera.

"The remaining genera of the *Robinieae* should be removed; they have bractlets under the flowers and characters in the fruit which do not suggest the fruit of *Robinia*. Of these *Diphysa* stands next to *Robinia* in the structure of the flowers and the leaves which are odd-pinnate, but the fruit is very peculiar, the pericarp separating into two layers, the exocarp which becomes bladdery, and the endocarp which is close-fitting to the seeds and constricted between them so that each seed is in a separate chamber. This may constitute a subtribe to itself. The rest, *Sesbenia*, *Daubentenia*, *Agati*, and *Glottidium* form a natural group with abruptly pinnate leaves, bractlets under the flowers and the fruit with more or less distinct cross-partitions between the seeds.

"The subtribe *Coluteae* is distinguished from the *Astragaleae* by the hairy style, a character which in *Robinieae* is barely counted of generic value, while in some species of *Astragalus* the style is hairy just under the stigma. *Colutea* and *Sutherlandia* have escaped from cultivation in the southern states and Mexico.

"As to the subtribe *Astragaleae* the author had not gone over the field enough to suggest any rearrangement. As treated in Engler and Prantl by Taubert it contains only three American genera, *Astragalus*, *Oxytropis* (*Aragallus*) and *Glycyrrhiza*. Even if these should constitute a subtribe the first genus at least must be broken up, for two of its segregates, *Homalobus* and *Kentrophyta* (both American), as already stated, have flat one-celled, two-valved pods as in *Robinieae* and the former has the habit of *Benthamantha* of that subtribe. In *Hamosa* another segregate, the pod is flat but longitudinally two-celled, and in *Atelephragma* rudimentarily so. Whether these genera or some of them should be transferred to the *Robinieae* or the two tribes merged, requires further study to decide. If these subtribes are to remain as heretofore, other distinguishing characters must be found."

Adjournment followed.

MARSHALL A. HOWE,
Acting Secretary

DATES OF PUBLICATION

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(The names of species and varieties described as new and of new combinations are in bold face type. Names of members of the Club, listed on pages 3 to 9, are not indexed.)

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OF THE

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A monthly journal devoted to general botany, established 1870. Vol. 46 published in 1919, contained 502 pages of text and 19 full-page plates. Price $4.00 per annum. For Europe, 18 shillings. Dulau & Co., 47 Soho Square, London, are, agents for England.

Of former volumes, only 24–46 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–46 three dollars each.

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(2) MEMOIRS

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(3) The Preliminary Catalogue of Anthophyta and Pteridophyta reported as growing within one hundred miles of New York, 1888. Price, $1.00.

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TORREYA

A BI-MONTHLY JOURNAL OF BOTANICAL NOTES AND NEWS

JOHN TORREY, 1796–1873

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

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TORREYA

Vol. 21 No. 1

January–February, 1921

THE FLORA OF THE TOWN OF SOUTHOLD, LONG ISLAND AND GARDINER'S ISLAND

By Stewart H. Burnham and Roy A. Latham

Second Supplementary List*

The following local observers have assisted in this list, by collecting or reporting unusual species; therefore establishing many new records and also new stations for species already reported in the two preceding lists. Mrs. F. R. Mitchell of Southold is specially mentioned for kindness in allowing a study of her long and interesting list of plants collected by herself and the late Mr. Mitchell, mostly in the vicinity of Southold, a decade or more ago. Mrs. Frank D. Smith of Peconic, Miss Mabel R. Wiggins of East Marion and William C. Ferguson of Hempstead should be mentioned. The following botanists have visited and collected in the region: Mrs. Agnes Chase, Mr. Wm. T. Davis, Mr. Norman Taylor and others.

Insect Galls†

Asteromyia carbonifera Felt—On leaves of *Euthamia tenuifolia.*
Caryomyia tubicola O.S.—On leaves of *Hicoria glabra* at Cutchogue.
Cecidomyia verrucicola O.S.—On leaves of *Tilia americana* at Southold.
Dasyneura Lysimachiae Beutm.—On *Lysimachia quadrifolia* at Orient.
Disholcaspis mamma Walsh—On twigs of *Quercus velutina* at Greenport.
Eriophyes Cephalanthi Cook—Greenport on leaves of *Cephalanthus occidentalis.*
E. semen Walsh—Orient on leaves of *Salix.*
Hormomyia canadensis Felt—Cutchogue on leaves of *Amelanchier oblongifolia.*
Lasioptera clavula Beutm.—On twigs of *Cornus* at Cutchogue, Greenport and Southold.

[No. 6, Vol. 20, of Torreya, comprising pp. 107–140, was issued 7 February 1921]

* The preliminary flora was published in Torreya 14: 201–225. Nov. 1914, and 229–254. Dec. 1914. The First Supplementary List was published in Torreya 17: 111–122, July 1917.

† The majority of these galls were named by Dr. E. P. Felt, state entomologist of the State of New York.

L. nodulosa Beutm.—Orient on stems of *Rubus.*

Livia maculipennis Fitch—On the inflorescence of *Juncus canadensis.*

Neolasioptera ramuscula Beutm.—On stems of *Doellingeria umbellata* at Orient.

Phylloxera Caryaesemen Walsh—Orient on the under surface of the leaves of *Hicoria glabra.*

Rhabdophaga strobiloides Walsh—On the tips of branches of *Salix humilis* at Peconic.

Rhopalomyia hirtipes O.S.—On aerial stems of *Solidago juncea* at Cutchogue and Peconic.

Euphyceae

Antithamnion americanum (Harv.) Farl.—In the Sound at Orient; determined by Dr. M. A. Howe.

Nitella intermedia Nordst.—Great Pond, Southold; determined by Dr. Howe who has examined specimens twice, and says, "this species or something close to it."

Phycomycetes

Empusa americana Thaxt.—On blow-flies, *Calliphora vomitoria* at Orient; determined by Prof. John Dearness. Many thousands of these flies are killed by this fungus during cold, wet spells in the summer. They are usually found clustered on the softer parts of grape vines.

Rhysotheca Haldstedii (Farl.) Wils.—On leaves of *Helianthus* in woods at Orient; determined by Prof. Dearness.

Ascomycetes (Excluding Pyrenomycetes)

Cudoniella marcida (Müll.) Sacc.—On earth in rich woods at Cutchogue. September. Determined by Dr. C. G. Lloyd as *Leotia marcida* Pers.: Mycol. Notes 63: 964. May 1920.

Geoglossum Farlowi Cke.—On earth in rich woods at Greenport. October. Determined by Dr. Lloyd who says "it is a very rare plant with spores 3-septate, 80 mic. long in these." It is difficult to believe, however, that it is other than a spore variation of the more common *Geoglossum hirsutum* Pers.

Peziza odorata Pk.—On ashes in a cellar at Orient; determined by Dr. Charles E. Fairman.

Phialea scutula (Pers.) Gill.—On dead herbaceous stems at Orient; determined by Dr. Fairman.

Pseudophacidium Betulae Rehm.—On twigs and small branches of *Betula populifolia* at Orient. Spring. Determined by Dr. Fairman, who says the find is noteworthy; and confirmed by Dr. E. J. Durand, who reports that it agrees with Rehm's Ascomyceten No. 866 in his herbarium.

Tapesia sanguinea (Pers.) Fckl.—On wood of *Juniperus virginiana* at Orient; determined by Dr. Fairman.

Ascomycetes (Pyrenomycetes)

Anthostoma gastrinum (Fr.) Sacc.—On dead branches of *Amelanchier canadensis* at Orient; determined by Prof. Dearness.

Botryosphaeria fuliginosa (M. & N.) E. & E.—Orient on stems of *Smilax rotundifolia;* determined by Prof. Dearness. No. 2107.

Camarosporium Robiniae (West.) Sacc.—Orient on *Robinia Pseudo-acacia*, associated with *Cucurbitaria elongata* (Fr.) Grev. No. 702. N. Y. State Mus. Bull. 197: 25. 1918.

Cryptospora aculeans (Schw.) E. & E.—On stems and twigs of *Rhus copallina* and *Toxicodendron radicans* at Orient; determined by Prof. Dearness.

Diaporthe (Chorostate) cercophora (Ell.) Sacc.—On dead twigs and branches of *Celtis occidentalis* at Orient; determined by Prof. Dearness.

Diaporthe (Euporthe) cryptica Nitschke—Orient on stems of *Lonicera japonica;* determined by Prof. Dearness.

Diaporthe (Euporthe) euspina (C. & E.) Sacc.—Base of stems of *Chenopodium ambrosioides* at Orient; determined by Prof. Dearness.

Diaporthe (Chorostate) oxyspora (Pk.) Sacc.—On twigs and branches of *Ilex verticillata* at Orient. N. Y. State Mus. Bull. 197: 38. 1918. (*Diaporthe ocularia* (C. & E.) Sacc.)

Diatrype Baccharidis Earle—Orient on stems and branches of *Baccharis halimifolia;* determined by Prof. Dearness. No. 4033.

D. disciformis (Hoffm.) Fr.—On branches of *Myrica caroliniensis* at Orient; determined by Prof. Dearness.

Diatrypella verrucaeformis (Ehrh.) Nitschke—On trunks of *Myrica caroliniensis* at Orient; determined by Dr. Fairman.

Didymosphaeria Celtidis E. & E.—On twigs of *Celtis occidentalis* at Orient; determined by Prof. Dearness.

Dothidea collecta (Schw.) E. & E.—Orient on twigs of *Iva frutescens;* determined by Prof. Dearness.

Erysiphe Cichoracearum DC.—On leaves and stems of *Plantago Rugelii* at Orient; determined by Dr. Fairman.

Eutypa leucostroma (Mont.) Sacc.—On stems of *Smilax rotundifolia* at Orient; determined by Dr. Fairman.

E. sepulta (B. & C.) E. & E.—Orient on stems of *Smilax rotundifolia;* determined by Prof. Dearness.

Eutypella cerviculata (Fr.) Sacc.—On branches of *Celtis occidentalis* at Orient; determined by Prof. Dearness.

E. Gleditschiae Berl.—On dead twigs of *Gleditschia triacanthos* at Orient. No. 724. N. Y. State Mus. Bull. 197: 29. 1918.

E. scoparia (Schw.) E. & E.—Orient on twigs of *Robinia Pseudo-acacia;* determined by Prof. Dearness. No. 1041.

E. venusta (Ell.) Sacc.—Orient on twigs of *Robinia Pseudo-acacia;* determined by Prof. Dearness. No. 1198.

Gibberella pulicaris (Fr.) Sacc.—On stalks of *Zea Mays* at Orient; determined by Dr. Fairman.

Gloniella ovata (Cke.) Sacc.—On decorticated and weathered wood of *Castanea dentata* at Orient. "The type of this species (collected by Ravenel in Carolina) is said to be on oak." No. 824. N. Y. State Mus. Bull. 205–206: 51. 1919.

Gloniopsis Cookeana (Ger.) Sacc.—Orient on dead wood of *Quercus alba*,

dead branches of *Myrica caroliniensis,* dead decorticated branches of *Rhus glabra* and *Xolisma ligustrina.* N. Y. State Mus. Bull. 197: 39. 1918.

Guignardia Bidwellii (Ellis) Viala & Ravaz—On fruit of cultivated grapes; determined by Prof. Dearness and Dr. Fairman. It is associated with *Phoma uvicola* B. & C. which Rostrup states is a stage of *Guignardia Bidwellii.*

Hypocrea rufa (Pers.) Fr.—A Corticium-like plant growing on oak; determined by Prof. Dearness. No. 3387.

Hypoxylon multiforme Fr.?—On wood of *Quercus velutina* at Orient; determined by Dr. Lloyd (printed): Letter 67: 7. July 1918.

H. rubiginosum (Pers.) Fr.—Orient on dead branches of *Rhus copallina;* determined by Prof. Dearness.

Hysterographium Lesquereuxii (Duby) Sacc.—On dead branches of *Gleditschia triacanthos* at Orient. N. Y. State Mus. Bull. 197: 30. 1918.

H. Vaccinii (Schw.) Fairman—This combination was made in the First Supplementary List in Torreya 17: 113. July 1917: but was wrongly spelled *Hysteriographium Vaccinii.*

Massaria conspurcata (Wallr.) Sacc.—On twigs of *Padus virginiana* (*Prunus serotina* Ehrh.) at Orient. Determined by Dr. Fairman, who says, "spores 60–65 × 13.5–14 μ." According to Ellis & Everhart, your specimen has spores agreeing more with those distributed by Dr. Rehm (in his Ascomyceten) than what Ellis noted in this country. That is, they are about the same width as foreign specimens and wider than those usually found here.

Massarinula Brassicae Dearn. & House—On dead stems of Brussels Sprouts, *Brassica oleracea gemmifera,* at Orient. September 1915. Type in the herbarium of the N. Y. State Museum. Described in N. Y. State Mus. Bull. 197: 31. 1918.

Microsphaera Alni (Wallr.) Salmon—The var. *Vaccinii* (Schw.) Salmon on leaves of *Vaccinium corymbosum* at Orient; determined by Prof. Dearness.

Phyllachora Graminis (Pers.) Fckl.—The var. *Panici* (Schw.) Spear on leaves of *Panicum cladestinum,* common throughout the town; determined by Prof. Dearness.

P. Pteridis (Reb.) Fckl.—On fronds of *Pteridium aquilinum* at Mattituck; determined by Prof. Dearness.

Pyrenophora calvescens (Fr.) Sacc.—On *Chenopodium ambrosioides;* determined by Prof. Dearness.

Rosellinia protuberans Karst.—Orient on wood of *Baccharis halimifolia;* determined by Dr. Fairman.

R. pulveracea (Ehrh.) Fckl.—On twigs of *Celtis occidentalis;* determined by Prof. Dearness.

Sphaerella pardalota C. & E.—Orient on old leaves of *Myrica caroliniensis;* determined by Dr. Fairman.

Trematosphaeria nuclearia (DeNot.) Sacc.—On decaying nuts of *Hicoria glabra* at Orient; determined by Prof. Dearness. No. 1202.

Valsa Liquidambaris (Schw.) Cke.—On dead stems of *Hamamelis virginiana* at Orient. "A new host species. The asci are 30–33 × 8 μ, the spores eight in an ascus, 8–9 × 2 μ, hyaline, allantoid." N. Y. State Mus. Bull. 197: 45. 1918.

V. Pini (A. & S.) Fr.—On dead bark and twigs of *Pinus Strobus* at Greenport; determined by Prof. Dearness. The fallen trunk of one tree that had been cut about a year was completely covered with this species, abundantly fruiting.

V. subclypeata C. & P.—Orient on dead branches of sassafras; determined by Prof. Dearness.

Xylaria corniformis Fr.—On buried roots of *Quercus velutina* at Orient; determined by Dr. Lloyd (printed): Letter 66: 4. Oct. 1917.

Hypomycetes

Cercospora Acalyphae Pk.—Orient on leaves of *Acalypha gracilens;* determined by Prof. Dearness.

C. circumscissa Sacc.—Common at Orient on leaves of *Padus virginiana* (*Prunus serotina*); determined by Prof. Dearness.

C. copallina Cke.—Cutchogue on leaves of *Rhus copallina;* determined by Prof. Dearness who says, "this is likely only a synonym of *Cercospora rhoina* C. & E."

C. rhoina C. & E.—On leaves of *Rhus copallina* at Cutchogue; determined by Prof. Dearness.

Cladosporium herbarum (Pers.) Link—Orient on leaves of *Hemerocallis fulva;* determined by Prof. Dearness.

Exosporium Tiliae Link—Orient on dead branches and trunks of *Tilia vulgaris;* determined by Prof. Dearness.

Fusarium Celtidis Ell. & Tracy—Orient on twigs of *Celtis occidentalis;* determined by Prof. Dearness.

Melanconiales

Cylindrosporium Iridis E. & H.—On living leaves of *Iris versicolor* at Orient. N. Y. State Mus. Bull. 197: *27.* 1918.

Gloeosporium Opuntiae E. & E.—On leaves of *Opuntia;* determined by Dr. Fairman. Large patches of the Eastern Prickly Pear have been killed by this fungus at Orient.

Marsonia Potentillae (Desm.) Fisch.—Greenport on leaves of *Potentilla canadensis;* determined by Dr. House.

Melanconium betulinum Schm. & Kze.—On twigs of *Betula populifolia* at Greenport; determined by Dr. Fairman.

Pestalozzia uncinata Ell. & Kell.—On leaves of *Quercus velutina;* determined by Dr. House.

Stagonospora Chenopodii Pk.—(*Phleospora Chenopodii* E. & K.) On leaves of *Atriplex hastata,* common at Orient; determined by Prof. Dearness.

Steganosporium acerinum Pk.—Orient on dead branches of *Acer Pseudo-Platanus.* Determined by Prof. Dearness who says, "may be a synonym of *Steganosporium piriforme* (Hoffm.) Cda.: Mr. Ellis used to call the larger spore form *S. cellulosum* Cda. and the smaller spore form *S. piriforme.* The spores are $36 \times 18\,\mu$."

Sphaeropsideae

Coniothyrium concentricum (Desm.) Sacc.—On leaves of cultivated *Yucca* at Orient; determined by Prof. Dearness.

Leptostromella Chenopodii Dearn. & House—Orient on dead stems of *Chenopodium album*. Described in N. Y. State Mus. Bull. 205–206: 53–54. 1919.

Macrophoma celtidicola Dearn. & House—Orient on twigs of *Celtis occidentalis;* determined by Prof. Dearness.

Phlyctaena arcuata Berk.—Orient on dead stems of *Helianthus annuus*. No. 726. "Spores filiform arcuate to falcate, 25 μ long." N. Y. State Mus. Bull. 205–206: 55. 1919.

Phoma Celtidis Cke.—On twigs of *Celtis occidentalis;* determined by Prof. Dearness. No. 3388.

Phyllosticta Chenopodii Sacc.—On leaves of *Chenopodium album* at Orient; determined by Dr. Fairman.

P. Kalmicola Schw.—Greenport on leaves of *Kalmia latifolia;* determined by Prof. Dearness.

Phyllosticta limitata Pk.—On leaves of apple, *Malus;* determined by Prof. Dearness. Very abundant throughout the town during the summer of 1919: and practically defoliating some trees.

P. minima (B. & C.) E. & E.—Laurel on leaves of *Acer rubrum;* determined by Dr. Fairman.

P. Sassafras Cke.—On leaves of *Sassafras,* common throughout the township. Determined by Prof. Dearness who says, "Ellis and Everhart in their North American Phyllostictas say the specimens available for examination are all sterile and that the species must be put in the doubtful class. The spots on some of these leaves have pycnidia with the small spores of the description; but most of the spots are sterile."

Septoria brunneola (Fr.) Niessl.—Cutchogue on leaves of *Vagnera racemosa;* determined by Prof. Dearness.

S. Macrosporia Dearn.—On leaves of *Chrysanthemum Leucanthemum* at Orient. Prof. Dearness says, "externally it is exactly like it but the spores fall short in average size."

S. mollisia Dearn & House—Mattituck on leaves of *Antennaria plantaginifolia;* determined by Prof. Dearness, who says this may be the same as Fairman's *Septoria lanaria*.

S. Polygonorum Desm.—Orient on leaves of *Persicaria Persicaria;* determined by Prof. Dearness.

S. Stellariae Rob. & Desm.—On leaves of *Alsine media* at Orient. Determined by Prof. Dearness who says, "the same as Fungi Columb. No. 775, which Mr. Ellis named as the above. It is not very distinct from *Septoria Silenicola* Ell. & Mart."

S. Violae West.—Greenport on leaves of *Viola cucullata;* determined by Prof. Dearness.

Sphaeronema Robiniae B. & C.—On twigs and branches of *Tilia americana* at Orient; determined by Prof. Dearness.

Sphaeropsis Celtidis E. & E.—On twigs of *Celtis occidentalis* at Orient. No. 3561. Determined by Dr. Fairman who says, "Cfr. Am. Nat. 428. 1897 and Saccardo Syl. 14: 921. I have never had this before: it was originally named from a specimen collected by Bartholomew on *Celtis occidentalis* in Kansas."

S. Syringae C. & E.—Orient on twigs of *Syringa vulgaris;* determined by Dr. Fairman.

Vermicularia herbarum West.—On old stems of *Geranium maculatum* at Orient; determined by Prof. Dearness.

Ustiliginaceae

Sorosporium Syntherismae (Pk.) Farl.—Orient on *Panicum dichotomiflorum;* determined by Dr. G. P. Clinton.

Uredinaceae*

Peridermium Peckii Thüm.—Common. On *Azalea viscosa* at Greenport, Peconic and Southold. On *Gaylussacia baccata* at Cutchogue. (*Pucciniastrum Myrtilli* (Schum.) Arth.)

P. pyriforme Pk.—Found sparingly during August on leaves of *Comandra umbellata* at Mattituck. (*Cronartium Comandrae* Pk.)

Pucciniastrum Agrimoniae (Schw.) Tranz.—Orient on leaves of *Agrimonia gryposepala.*

P. Pyrolae (Pers.) Diet.—Southold on *Chimaphila maculata;* but one collection found.

Pucciniaceae

Puccinia Anemones-Virginianae Schw.—On leaves of *Anemone Virginiana* at Indian Neck, Peconic. August.

P. Circaeae Pers.—Orient on leaves of *Circaea Lutetiana.*

P. Ellisiana Thüm.—Orient on *Schizachyrium scoparium.* November.

P. investita Schw.—On *Gnaphalium obtusifolium* at Cutchogue, Orient and Peconic. August.

P. minutissima Arth.—Mattituck on stems and leaves of *Decodon verticillatus.* August. Very common in one swamp and forming large swellings on stems and the midveins of leaves. (*Aecidium Nesaeae* Ger.)

P. patruelis Arth.—On leaves of *Lactuca canadensis* at Orient. June. Dr. Arthur says, "lately has been called *Puccinia hieraciata* (Schw.) Jackson. This is rather a rare rust in New York and in fact throughout the Atlantic states: but is very common in the interior. It has telia on various species of *Carex*.".

Uromyces Hyperici-frondosi (Schw.) Arth.—Gardiner's Island on leaves of *Hypericum mutilum;* determined by Burnham.

U. Lespedezae-procumbentis (Schw.) Curt.—On *Lespedeza capitata* at Cutchogue, Peconic and Southold. On *Lespedeza virginica* at Cutchogue. Locally common at these stations. (*Nigredo Lespedezae-procumbentis* (Schw.) Arth.)

* Unless otherwise stated the Rusts were determined by Dr. J. C. Arthur.

U. Polemonii (Pk.) Barth.—N. Y. State Mus. Bull. 197: 13. 1918, as a contribution; probably on *Spartina stricta alterniflora*.

TREMELLACEAE

Dacryomyces deliquescens (Bull.) Duby—On old wood of *Juniperus virginiana;* determined by Dr. Lloyd: Mycol. Notes 63: 964. May 1920.

Exidia recisa Fr. On branches of *Quercus velutina* at Orient; determined by Dr. Lloyd: Mycol. Notes 63: 964. May 1920.

Naematelia nucleata (Schw.) Fr.—On old bark of *Quercus velutina;* determined by Dr. Lloyd (printed): Letter 66: 4. Oct. 1917.

THELEPHORACEAE

Aleurodiscus nivosus (B. & C.) v. Höhn & Litsch.—On bark of *Juniperus virginiana* at Orient. No. 189. (In Mo. Bot. Gard. Herb., 44228) (*Stereum acerinum* Pers., var. *nivosum* B. & C.) Ann. Mo. Bot. Gard. 5: 195. 1918.

Craterellus cornucopioides (L.) Pers.—"Note 862. The common *Craterellus cornucopioides* is usually so regular and cup shaped that we were somewhat surprised to receive a collection lobed and almost divided at the base, from Mr. Latham. We supposed that it had been torn accidentally but Mr. Latham stated that it grew naturally in this way and he found a large colony of this form." Dr. Lloyd's Mycol. Notes 63: 965. May 1920.

Cyphella muscigena (Pers.) Fr.—*Thuidium paludosum* has been found "only in one locality, a blackish meadow in Orient. It is common there, but rarely fruiting. It is a frequent host of *Cyphella* in this plot. There are several other species of musci associated with the *Thuidium*. It is interesting that the fungus should go commonly to this single species and not at all to the others." Bryol. 23: 7. Jan. 1920. Determined by Dr. Fairman.

Hymenochaete agglutinans Ellis—On *Sassafras;* determined by Prof. Dearness.

H. corrugata (Fr.) Lev.—Orient. No. 154. (In Mo. Bot. Gard. Herb., 44229.) Determined by Dr. E. A. Burt. Ann. Mo. Bot. Gard. 5: 361. 1918.

Thelephora multipartita Schw.—On earth in woods at Orient; determined by Dr. Lloyd: Mycol. Notes 63: 965. May 1920.

Thelephora spiculosa Fr.—On earth in dry woods at Cutchogue; determined by Dr. Lloyd who says "rare."

Tremellodendron merismatoides (Schw.) Burt—On heavy soil in woods at Orient; determined by Dr. Lloyd.

HYDNACEAE

Hydnum caryophylleum B. & C.—On old wood of *Hicoria glabra* at Orient; determined by Prof. Dearness.

H. vellereum Pk.—In dry woods at Cutchogue. Dr. Lloyd says, "quite fragrant when received": Mycol. Notes 63: 964. May 1920, as *Hydnum amicum* Quel.

H. zonatum of American Mycology—In dry woods on earth at Cutchogue. Determined by Dr. Lloyd: Mycol. Notes 63: 964. May 1920, as *Hydnum scrobiculatum* Fr.

Phlebia merismoides Fr.—Orient on *Prunus Avium;* determined by Dr. Lloyd (printed): Letter 69: 7. April 1919.

Radulum pallidum B. & C.—On underside of a decayed log of *Pinus Strobus* in a swamp at Greenport; determined by Dr. Lloyd (printed): Letter 69: 7. April 1919.

POLYPORACEAE

Daedalea ochracea Lloyd—On oaks at Cutchogue; determined by Dr. Lloyd: Mycol. Notes 63: 964. May 1920. Under Note No. 137, Dr. Lloyd says, "I would designate the light colored forms of *Daedalea unicolor* . . . which correspond to *Polystictus ochraceus* as forms of *Polystictus hirsutus.*"

Merulius bellus B. & C.—Orient, "comm. by N. Y. State Herb., P66 (in Mo. Bot. Gard. Herb., 43604)." Ann. Mo. Bot. Gard. 4: 332. Nov. 1917.

Merulius brassicaefolius Schw.—On earth in a cellar at Orient; determined by Dr. Lloyd.

Polyporus brumalis (Pers.) Fr.—Greenport on *Vaccinium;* Orient on wild cherry; and Southold on *Sambucus canadensis.*

P. (Ganoderma) Curtisii Berk.—On trunks of living apple tree. Determined by Dr. Lloyd who says, "this is a southern unvarnished form of *Polyporus lucidus,* it is quite common in the south, but rarely found as far north as with you" (printed): Letter 67: 7. July 1918. Previously reported as *Ganoderma pseudoboletus* (Jacq.) Murrill.

P. pocula (Schw.) B. & C.—Orient on living bark of *Quercus velutina* at Orient. Found growing in clusters in April. Determined by Dr. Lloyd who says, "a unique little species": Mycol. Notes 63. 965. May 1920.

P. stipticus (Pers.) Fr.—On wood of *Quercus velutina* at Orient; determined by Dr. Lloyd (printed): Letter 66: 4. Oct. 1917.

P. trabeus Rostk.—On wood of *Quercus velutina* at Orient; determined by Dr. Lloyd (printed): Letter 67: 7. July 1918.

Polystictus dependens B. & C.—On the underside of a log of *Pinus rigida* at Cutchogue. September. No. 2080. A colony of about a dozen plants ranging from ¼ to ¾ of an inch in diameter. "Note 861. A rare species (Cfr. Stip. Polyporoids, p. 165) only known from a few stations in the south. This is the only collection in any way northern. Otherwise it is only known from one collection from Japan": Dr. Lloyd's Mycol. Notes 63: 965. May 1920.

Polystictus hirsutus (Wulf.) Fr.—The form *Polystictus hirsutulus* Schw. on *Quercus velutina* at Orient; determined by Dr. Lloyd (printed): Letter 69: 7. April 1919.

Poria omoema Berk.—On limbs of *Betula populifolia* at Orient; determined by Prof. Dearness who says a similar plant was named this species for him by Mr. Ellis. The type of this species was collected on pine in South Carolina by Mr. Ravenel. (= *Poria subacida* (Pk.) Sacc.)

AGARICACEAE

Crepidotus applanatus (Pers.) Fr.—Orient on trunks of *Quercus velutina;* determined by Dr. Lloyd (printed): Letter 67: 7. July 1918.

Lenzites albida Fr.—On trunk of *Acer rubrum* at Greenport; determined by Dr. Lloyd who says, "the old, bleached white, wintered, lenzitoid form of *Daedalea confragosa*."

L. corrugata Klotsch.—Orient on oaks and *Sassafras;* determined by Dr. Lloyd (printed): Letter 69: 7. April 1919.

Panus strigosus B. & C.—Formerly reported from Orient as *Panus levis* Berk. The Orient plant is figured in Dr. Lloyd's Mycol. Notes 52: 746. fig. 1120. Dec. 1917.

Pleurotus niger Schw.—On terminal branches of *Rhus copallina* at Orient. Plants ⅛ of an inch in diameter and slaty black. Dr. Lloyd says it is rare (printed): Letter 69: 7. April 1919.

P. sapidus Klachb.—On stumps of *Hicoria glabra* at Orient; determined by Dr. Lloyd (printed): Letter 69: 7. April 1919, and Mycol. Notes 63: 965. May 1920.

Gasteromycetes

Calvatia lilicina Berk.—On earth in rich woods at Orient; determined by Dr. Lloyd: Mycol. Notes 63: 965. May 1920.

Dictyophora duplicata (Bosc) Ed. Fisch.—On earth in moist woods at Cutchogue, Orient and Southold; determined by Dr. Lloyd as *Phallus duplicatus:* Mycol. Notes 63: 964. May 1920.

Lycoperdon gemmatum Batsch—On pure sand at Orient; determined by Dr. Lloyd.

Scleroderma Cepa Pers.—On pure sand in shade of pines and open ground at Southold; determined by Dr. Lloyd: Mycol. Notes 63: 964. May 1920.

Musci

Amblystegium varium (Hedw.) Lindb.—Orient at the base of a hickory tree about a moist cavity; determined by Mr. G. B. Kaiser.

Fontinalis gigantea Sulliv.—Swamp woods in water at Mattituck; determined by Dr. A. J. Grout. No. 1736.

Mnium cinclidioides Hüben.—In a swamp at Mattituck. No. 1843. Determined by Dr. Grout who says, "a depauperate form . . . the first to be reported from Long Island so far as I know, although it apparently is frequent along the west bank of the Hudson river."

Polypodiaceae

Adiantum pedatum L.—Southold, localized in moist woods south of Great Pond. The reference to this species in the first part of this Flora was an error: the above record is the only known station in the town. It was first discovered many years ago by Miss Mary H. Huntting and reported by Mrs. Frank D. Smith.

Polypodium vulgare L.—Sandy soil at Orient. No. 2331.

Polystichum acrostichoides (Mx.) Schott—Rare in woods south of Great Pond, Southold, Sept. 10, 1919. No. 4088.

Lycopodiaceae

Lycopodium adpressum (Chapm.) Lloyd & Underw.—Southold in a sandy bog. No. 3455.

L. obscurum L.—Moist woods at Orient and Southold.

(*To be continued*)

NEW COMBINATIONS FOR PHANEROGAMIC NAMES

By J. C. Arthur

In order to secure uniformity in citing the names of hosts for species of Uredinales the following new combinations are proposed. So far as the writer can ascertain these combinations have not been made before, and in coming to this conclusion he has had the kindly assistance of a number of correspondents.

Cnidoscolus urens (L.) comb. nov. (*Jatropha urens* L. Sp. Pl. 1007. 1753). A common plant of tropical America, bearing *Uromyces oaxacanus* Diet. & Holw.

Adenoropium angustifolium (Griseb.) comb. nov. (*Jatropha angustifolia* Griseb.; Goett. Nachr. 171. 1865). A Cuban species bearing the imperfectly known rust *Uredo jatrophicola* Arth.

Vincetoxicum bifidum (Hemsl.) comb. nov. (*Gonolobus bifidus* Hemsl., Biol. Centr. Am. Bot. **2**: 330. 1879).

Vincetoxicum erianthum (Decaisne) comb. nov. (*Gonolobus erianthus* Decaisne; DC. Prodr. **8**: 592. 1844).

Vincetoxicum uniflorum (H.B.K.) comb. nov. (*Gonolobus uniflorus* H.B.K. Nov. Gen. Sp. **3**: 207. 1818). These three Mexican species of Vincetoxicum, belonging to the Asclepiadaceae, bear the very common tropical rust *Puccinia obliqua* Berk. & Curt.

Sphaeralcea arcuata (Greene) comb. nov. (*Malvastrum arcuatum* Robinson; A. Gray, Synop. Fl. N. Am. 1^1: 311. 1878).

Sphaeralcea fasciculata (Nutt.) comb. nov. (*Malva fasciculata* Nutt.; T. & G. Flora N. Am. **1**: 225. 1838). These two Californian species belonging to Malvaceae bear the common western rust *Puccinia Sherardiana* Körn.

Madronella viridis (Jepson) comb. nov. (*Monardella viridis* Jepson, Flora W. Mid. Calif. 465. 1901). A plant of western California bearing *Puccinia Monardellae* Dudl. & Thomp., a distinctively Californian rust.

Coleosanthus megalodontus (Greenm.) comb. nov. (*Brickellia megalodonta* Greenm. Proc. Am. Acad. **40**: 34. 1904). A Mexican plant bearing the rust *Puccinia Brickelliae* Peck.

Purdue University,
Lafayette, Indiana

SHORTER NOTES

Notes on Hemerocallis, II.—A previous note (Amer. Mid. Nat. 1914–15) dealt with the nomenclature, specific description, and the distribution of the North American members of this genus, *H. fulva* and *H. flava*. In 1917, the writer conducted experiments upon *H. fulva*, obtaining results which appear to be of interest if only from a negative standpoint, since the experimental procedure involved seems somewhat similar to the more probable physiological forces at work in the conditions under which the plant forms mature seeds.

Referring to Knuth's Handbook of Flower Pollination, we read that, "according to Sprengel's assertion which Kerner confirms, the plant (*H. fulva*) never sets fruit here, so it is highly probable that in its original home in E. Asia, it is pollinated by such insects as are not to be found in Europe. Maximowicz states that artificial pollination is also ineffective, the flowers do not produce mature seeds in Europe. Sprengel, who pollinated the flowers artificially with their own pollen, also obtained no fruits, etc."

No such limitations affect *H. flava,* indeed Linnaeus believed *H. flava* and *H. fulva* (commonly known as the yellow lily and day lily respectively) to form a composite type species (*H. lilio-asphodelus*), for the genus, and that one was really a variety of the other, a fact readily comprehensible when their great anatomical, if not physiological resemblance, be kept in mind.

Largely from the basis of the preceding information the writer attempted to produce mature seeds in *H. fulva*. The experiments conducted divided themselves into four groups:

I. Fertilization of the flowers with their own pollen.

a. After the blossoms had completely opened.

b. Before the blossoms had opened sufficiently for them to be pollinated from other sources, but when their own pollen seemed about to discharge.

c. Before the blossoms had opened sufficiently to obtain pollen from other sources, an incision was made in the ovary, and pollen as obtained in the preceding placed therein.

d. Before the blossom had completely opened the stigma was snipped off, and pollen placed directly upon the top of the style.

II. Fertilization of the flower with pollen from the same clump of day lilies. In this group further procedure was essentially similar to that outlined in Group I, except that the anthers of the flower were first removed.

III. Fertilization of the flowers with the pollen of a far removed clump of day lilies. Inquiry revealed the fact that this group of the plants and that used in Group I did not have a common original locality and were probably genetically distinct. In Group III also the further procedure was similar to Group I, except that the anthers of the pollinated flower were first removed.

IV. Fertilization of the flowers with pollen from the yellow lily, *H. flava*. Attempts at cross-fertilization were made as already indicated in the other groups.

Control of the above experiments was obtained by tying a small paper bag over each experimental flower. *The results of the above experiments were negative in every respect.* No mature seeds were ever formed. An effect of the paper bags was to lengthen the life of the flower appreciably.

In a previous number of TORREYA (Vol. 18, Dec. 1918), double flowers were reported for *H. fulva*. Continued observation indicates that such seem common in the Mississippi river region from Missouri up to St. Paul, Minn. In some localities no other type of flower was observed. N. M. GRIER

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REVIEWS

Gager's Heredity and Evolution in Plants

Under this comprehensive title, Dr. C. Stuart Gager has recently published a little book (P. Blakiston's Son & Co., pages xiii + 265, price $1.25) of remarkable interest: remarkable in that it presents within so small a compass a digest of such broad and complex subjects.

The whole book may be summarized in a few lines. The reproductive system is the machinery for heredity; long-continued heredity is evolution; the results of evolution are expressed by the morphological differentiation of plants and by their distribution in space and time. Each of these themes is discussed by the author in turn.

Under the first head, the author devotes two chapters to the life history of a fern, wisely selecting for illustration a plant with well developed gametophyte rather than an angiosperm. The third chapter introduces some general considerations based on the facts presented in the two preceding, and discusses briefly but clearly the general nature of reproduction, alternation of generations, and reduction; this is followed by a general definition of inheritance and an entirely too brief discussion of the struggle for existence and the elimination of the unfit. Unfortunately this portion is marred by two rather serious errors or omissions.

The fourth chapter deals with the laws of heredity. Here the reviewer, who makes no pretence of erudition in genetics, at once came into difficulties. On page 40, inheritance is defined as "the recurrence in successive generations of a similar cellular constitution," while on page 48 the statement is made that inheritance is "all that an organism has to start with. It is the protoplasmic substance, with all its potentialities, passed on from parent to offspring." Now thorns recur on successive generations of roses, agreeing with the first definition, but a young rose does not have thorns to start with. Would it not have been just as clear to the general reader if inheritance had been defined as the potentiality of the protoplasmic substance passed on from

parent to offspring? The author then shows the distinction between inheritance and expression of heredity, and passes on to chapter 5, the experimental study of heredity. About half of this is devoted to an exposition of the well known work of Mendel and the rest to the work of Johannsen and Weismann, including a statement of the general unsolved problems developed as a result of their investigations.

Chapters 6 and 7 discuss the general nature of evolution, which is regarded as the major problem of botany, describing the ideas of Agassiz and Lamarck briefly and those of Darwin and Wallace in greater detail. These two chapters impress the reviewer as unusually well written. Chapter 8, on experimental evolution, is devoted almost entirely to a summary of the methods and results of De Vries' experiments and to the mutation theory in general.

The second half of the book deals with the results of evolution in plants, attempting to present modern ideas on the genetic relations of plants and on the phylogeny of angiosperms in particular, utilizing evidence from the comparative morphology and life history of living plants, from geographical distribution, and from the structure and chronological succession of fossil forms. The author inclines strongly toward Bower's ideas, but tries to present all sides of the question impartially. The 44 pages devoted to geographical distribution make an excellent compendium of the whole subject, presenting not the actual facts of modern distribution but rather the general nature and dynamics of the subject, basing the whole on the migration of seeds and proceeding to a discussion of endemism, discontinuous distribution, and the age and area hypothesis.

A shorter chapter deals with some of the general principles derived from a study of fossil plants, beginning with the conditions of fossil formation, presenting a general statement of the distribution of plants in time, and discussing in interesting fashion the causes of the extinction of species.

In chapter 12 the fossil seed-bearing ferns are discussed in more detail, particularly the Cycadeoidea, which are accepted by the author as the immediate progenitors of angiosperms, following the views of Arber and others, which are presented in inter-

esting and critical form. Polycotyledony is regarded as more primitive than dicotyledony, in agreement with the recent work of Bucholz, and the monocotyledons are derived from the Ranalian plexus. Due attention is of course given to other theories. The final chapter presents in tabular form the names and classification of the main groups of plants, with the angiosperms placed in practically the Engler and Prantl sequence. A brief bibliography and index occupy the remaining pages.

In general, the book is both interesting and readable. It is modern in including recent developments in botanical science, fair in presenting different controversial views, and satisfactory in inclining to one view while recognizing the claims of others. Unfortunately, typographical errors are frequent.

H. A. Gleason

NEWS ITEMS

Contributors will please note that Mr. Norman Taylor, who has been the editor of Torreya for the last ten years has resigned that position. Mr. George T. Hastings of 7 Robbins Place, Yonkers, N. Y., has been elected editor and all matters relating to Torreya should be sent him.

Dr. and Mrs. N. L. Britton, accompanied by Dr. F. J. Seaver, have sailed for Trinidad where exploration of that island and adjacent regions will be carried on.

The Torrey Botanical Club

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Polyporeae: M. Levine
Exobasidii: H. M. Richards
Rusts and Smuts: E. W. Olive
Discomycetes: B. O. Dodge
Lichens: W. C. Barbour
Sphaeriaceae, Dothideaceae: H. M. Richards
Hypocreaceae, Perisporieae, Plectascineae, Tuberineae: F. J. Seaver
Fungi-forming sclerotia: A. B. Stout
Imperfecti: H. M. Richards, F. Seaver, Mel T. Cook
Oomycetes: C. A. King
Zygomycetes: A. F. Blakeslee
Chytridiaceae,
Myxomycetes: Mrs. H. M. Richards
Yeast and Bacteria: Prof. J. Broadhurst
Insect galls: Mel T. Cook

OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 47 published in 1920, contained 598 pages of text and 17 full-page plates. Price $4.00 per annum. For Europe, 18 shillings. Dulau & Co., 47 Soho Square, London, are, agents for England.

Of former volumes, only 24–47 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–47 three dollars each.

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(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

DR. F. J. SEAVER

New York Botanical Garden

Bronx Park, New York City

Vol. 21 March–April, 1921 No. 2

TORREYA

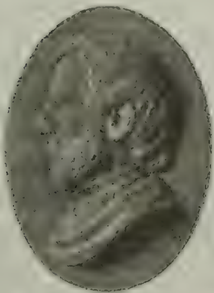
A Bi-Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS



JOHN TORREY, 1796–1873.

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THE TORREY BOTANICAL CLUB

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Yonkers, N. Y.

TORREYA

Vol. 21 No. 2

March–April, 1921

THE WILD FLOWER PRESERVATION IDEA IS ONE OF PRACTICAL VALUE*

By Homer D. House,

State Botanist of New York

Our attention has been directed most pointedly within recent years to the necessity for the conservation of all those natural resources which have to do with the economic life of the state and nation. It is an urgent and pressing need and calls for broad and effective legislation.

Not less important, perhaps, but from a different point of view, is the need of conserving or preserving all forms of wild life which contribute so richly to the mental stimulus of our people, and which add to the recreational value of our woods, forests and fields; of these, the wild flowers form a not inconsiderable part. To some people the value of our great out-of-doors depends upon fishing and hunting game birds and animals; but it is important that we also recognize that even a greater and constantly increasing number of people derive the greatest value during their hours of leisure and in their vacations from the study of plant and bird life and the habits of animals. Such recreational studies are powerful contributions to peace of mind, happiness, equanimity, and a broader, more sympathetic outlook upon life.

Our vacation playgrounds, whether they are National Parks, State reserves or just plain unprotected wild country have a value that should not be measured in money units, but by their indirect influence upon the lives and activities of those who enjoy the ad-

* Abstract of an illustrated lecture given at a joint meeting of the Torrey Botanical Club and the Wild Flower Preservation Society, at the New York Botanical Garden, May 26, 1920.

vantages for recreation that they afford—and the automobile with the improved highways has opened the door to thousands who never before were able to appreciate the beauties of nature.

This for lack of a better name we may designate as the esthetic

value of nature, and I think few persons will deny that in the long run it works for our good.

There is another aspect of the situation, one which borders on the economic. It is based on the fundamental and well-known fact that all of the elements of nature are closely interwoven and interdependent and that the loss of even a part of one entails the

corresponding loss of the others. It is easier to destroy plant life than any other form of wild life. The result is that the so-called "balance of nature" is seriously disturbed, and that all animals, including the birds dependent for food upon the destroyed plants, and the insects correlated with them, must also disappear—by death or by retreat to regions still primeval. It would take too much space to go into details, but I think that a very direct connection can be traced between the diminishing wild flowers and the scarcity of many desirable species of birds and animals, as well as the unwelcome increase of undesirable forms of insects. The destruction or wholesale gathering of wild flowers disturbs the balance of nature and their place is taken by weeds. There must follow a change in the insect and bird life, and in this readjustment some species of insects, animals and adventive plants become pests, accomplish great damage, and cause the expenditure of large sums of money for control measures.

The automobile is a great factor in our modern life for pleasure and for good, but it is also a great factor in the more rapid destruction of wild flowers, by those thoughtless persons who cannot be satisfied with seeing wild flowers at home in their incomparable surroundings, but needs must uproot, break down and gather them by the armful. The only satisfaction to be gained is a few brief hours of doubtful pleasure which the flowers may yield from bowls and vases. They then go to join the despised contents of the garbage can. Where they formerly grew in the woods, their beauty will not delight the passerby again for many years, perhaps never again in that spot if the destruction was sufficiently complete. By such methods have many of our byways and woodlands, formerly so attractive with their wealth of true Americans, become the abiding place of burdock, thistle, mustard, ragweed, and numerous other obnoxious aliens. Even more regrettable is the fact that the disturbance does not end with the mere change of plant life. The insects, animals and bird life also suffer a marked change, adding nothing to the attractiveness of such byways and woodlands.

Any effort toward the preservation of wild flowers is therefore

also an effort toward the preservation of all wild life, and the value of such efforts toward preservation is both economic and practical.

The diminished numbers of many of our most attractive wild flowers is of course due in large part to the undeniable needs of agriculture. However if we consider the diminishing abundance of attractive wild flowers in the still large areas of woodland and forest remaining in the agricultural areas we realize that there

are other and more important agencies. Chief among those agencies we must place fire. Often accounted as of little importance, occasional or frequent ground fires running through the dried leaves and litter of the woodland floor have been most important in the destruction of plants which are intolerant to fire.

Trailing arbutus, or mayflower, has been especially persecuted by ground fires; its manner of growth makes it almost impossible to gather without pulling it up by the roots and its attractiveness and delicate odor make it much sought after. Considering all these things it is little wonder that the trailing arbutus is now a

very rare plant in many sections of the country where formerly it was common.

The list of wild flowers which have suffered most severely from the overzealous admirers is a long one, but space need be taken to mention only a few of the most important. They are the showy lady's-slipper, the moccasin flower, the rose pogonia, the arethusa, mertensia or blue bells, white water lily, American lotus, and the anemone or wind flower. To this list I am sure almost any lover of wild flowers could make many additions.

Education looking toward the right estimation and preservation of our diminishing forms of wild life ought to be more generally and widely extended, but even at its best probably would not reach many classes of people who are the worst offenders. Meanwhile it seems most desirable that we should use all our efforts in the establishment of national, state and private wild-life reserves, of both large and small size, in all sections of the land, where not alone shall the animal and bird life find safety and refuge but where also the native plant life shall be equally protected.

THE RECEPTACLE OF ACHILLEA MILLEFOLIUM L.

By Mabel L. Merriman

The receptacle of the genus *Achillea* is given as flat or convex in Britton's manual of North American flora. Similarly in Gray's new manual the character of the receptacle is expressed by the word "flattish."

Clusters of *Achillea millefolium* L. brought in for class study in Oct., 1919, exhibited heads either markedly conical or oblong in shape in contrast to the usual flat-topped or slightly convex forms. It was thought at first that the difference in appearance might be due to a lengthening of the tubular flowers in the center of the head. A lengthwise section of the head showed that the receptacle had become much elongated, being narrowed to nearly the width of the stem axis, the section suggesting in its contour

spicate inflorescence. The presence of buds at the apex of the section signifies that such elongation must have preceded flower formation and hence have been an early growth of the meristematic tissue; an evidence of a change in organization rather than an adaptive variation.

The interest awakened by these specimens stimulated further collections in other localities in the fall months of 1920. Plants with conical and oblong heads were collected at various points in Highlands, N. J. These plants were growing in gravelly soil on hillsides at some distance from the beach.

Fig. 1 was drawn to scale from a lengthwise section of a normal head with a flat receptacle. The projection of tubular flowers beyond the marginal ray flowers is less than one mm. in the flat receptacled forms. The external view of a head shown in Fig. 2 and the lengthwise section in Fig. 3 are of an example on another branch of the same plant where the prolongation of the head beyond the involucre was 4 mm. There were from 23 to 27 flowers in these heads while those with the flat receptacles averaged 12 flowers in a head. In all examined it was found that the elongation of the receptacle resulted in an increase of perfect flowers and hence of fruits. It has been shown by various investigators as reviewed by Stout and Boas* in their statistical studies of *Cichorium* that number of flowers per head varies with the position in the inflorescence. With *Achillea* it would appear that the form of the receptacle is a governing factor.

Two weeks later when on a collecting trip in the Edenwald section of the Bronx plants were found possessing receptacles with a much greater elongation. Figs. 4 and 5 are of one from this locality. Expressing the measurements in order of proximity of heads in a corymb, the elongation of the receptacles are as follows in mm.: 7, 7, 7, 6, 6, 8, another 8, 9, 11, 11, 10, 11, 10, 10, 7, 9, in another 10, 9, 10, 10, 11, 11, with six succeeding of 10 mm. Another branch had corymbs with 4 adjoining heads of 10 mm., 7 of 9 mm., with the remaining ones of 8, 8, 9, 9, 8 mm. It is to

* Stout, A. B., and Helene M. Boas, Statistical Studies of Flower Number per Head in *Cichorium intybus* N.—Kinds of Variability, Heredity and Effects of Selection, Mem. Torrey Bot. Club: 17. 334–458, 1918.

be noted that these specimens show not only heads of greater elongation than those previously found but that on the corymbs there are no heads showing intermediate stages and in all the

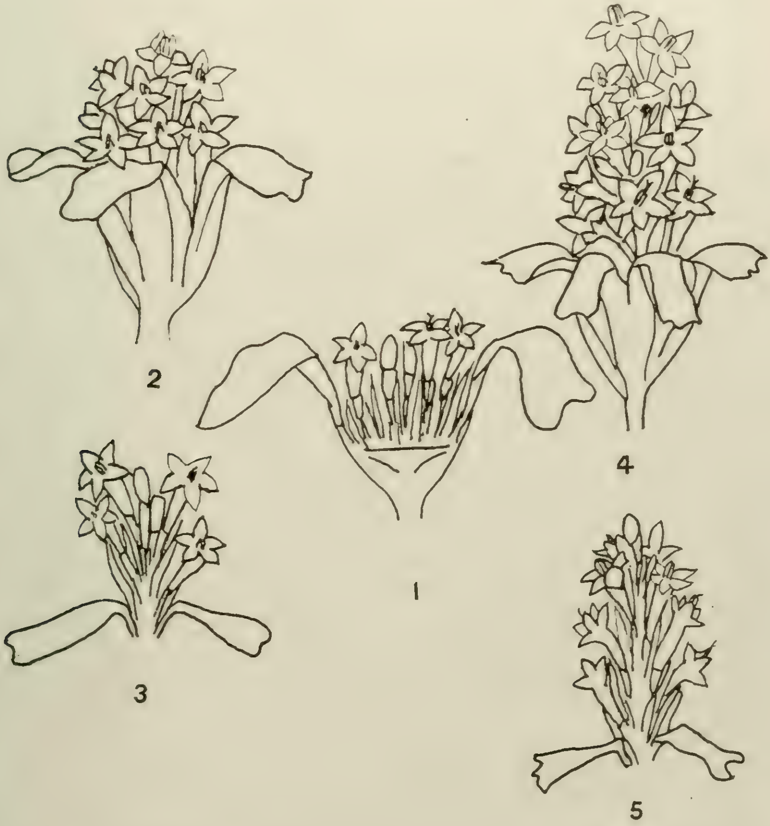

FIG. 1. A lengthwise section of a common form of yarrow with flat-topped receptacle. × 5.

FIGS. 2 AND 3. External view and lengthwise section of a head with an elongated receptacle measuring 4 mm. × 5.

FIGS. 4 AND 5. External view and lengthwise section of a head with an elongated receptacle measuring 7 mm. × 5.

heads there is a tendency in nearby receptacles to show a similar measurement. Another plant with heads similar to that shown in Fig. 4 had ray flowers interspersed with the tubular flowers on the elongated receptacle. These were in addition to the usual number surrounding the head.

The depth of the involucre remained constant for all the forms collected.

The notes here presented are but inadequate observations. They suggest the desirability of conducting genetical studies in this genus which as in the case of the mutating oenotheras consist of forms growing far from their place of origin.

Extensive experiments might solve the problem as to whether in these elongated receptacles we have mutating characters or reversions. The resulting spike-like cluster characteristic of more primitive plants might indicate the latter interpretations as the more probable. Jost states on page 395 of his work on Plant Physiologie:† "New characters, that is mutations, behave the same as reversions."

It is in the genus *Achillea* that we also have the oft-quoted examples of species mutually excluding each other from calcareous and siliciferous soils. Schimper states in Plant Geography,‡ page 105, that *Achillea millefolium* will grow equally well in either kind of soil while *A. moschata* is an inhabitant of siliciferous soil, excluding *A. atrata* which prefers calcareous soils. It would be of interest to determine the lengths of the receptacles of the plants growing in these different kinds of soils and the influence if any of change of soil in modifying the lengths of the receptacle. It is possible also that seasonal conditions may be important factors in the appearance of these interesting plants.

Hunter College,
New York City

ADDITIONS TO THE FLORA OF WESTERN OREGON DURING 1920

By James C. Nelson

Although the writer did not find it possible to collect very extensively during the past season, the introduction of foreign plants into Western Oregon seems to have gone on unchecked.

† Jost, Ludwig, Lectures on Plant Physiology, 1907, trans. by Gibson.

‡ Schimper, A. F. W., Plant Geography upon a Physiological Basis, 1903, trans. by Fisher.

All of the species listed below were found growing spontaneously with a good chance of persisting, and none of them find mention in Piper & Beattie's Flora of the Northwest Coast, although all were collected within the limits of that manual. These 34 species bring the total number of species not mentioned in the above work, but reported by the writer, to 343.

Species plainly introduced are marked *.

1. *Alisma Plantago-aquatica* L. var. *parviflorum* (Pursh) Torr. Muddy shore of Willamette River, Eugene.
2. *Muhlenbergia squarrosa* (Trin.) Rydb. Muddy shore of Columbia River on Hayden Island, opposite Vancouver, Wash. Not infrequent along the upper Columbia.
3. **Cynosurus echinatus* L. Abundantly established on dry slope of Skinner's Butte, Eugene.
4. **Eragrostis cilianensis* (All.) Link. Sandy river-bank near city dump, Eugene.
5. **Agropyron glaucum* R. & S. In shipyard on old ballast, Linnton, Portland.
6. **Ornithogalum umbellatum* L. An occasional escape to vacant lots and roadsides, Salem.
7. **Allium Cepa* L. Occasional on railroad-embankments near Salem.
8. **Urtica dioica* L. In shipyard on old ballast, Linnton, Portland.
9. **Maclura pomifera* (Raf.) Schneider. Freely escaping from a neglected hedge along roadside near Springfield, Lane Co.
10. **Rumex cuneifolius* Campd. In shipyard on old ballast, Linnton, Portland. A Patagonian species.
11. **Atriplex rosea* L. Sandy waste ground on river-shore. Lower Albina, Portland. Previously reported by Suksdorf.
12. **Amaranthus paniculatus* L. Waste ground at old city dump, Salem. Occasional in cultivation.
13. **Corrigiola littoralis* L. Abundant in dry gravelly soil in railroad-yards, Lower Albina, Portland. Previously collected by Suksdorf.

14. **Raphanus Raphanistrum* L. var. *purpureus* (Reichenb.) Domin. Growing with the species along railroad-tracks in State Fair Grounds, Salem.
15. **Erysimum repandum* L. Along railroad-tracks, Lower Albina, Portland; and in similar situations at Salem.
16. **Lepidium densiflorum* Schrad. var. *pubecarpum* (A. Nels.) Thellung. Waste ground in railroad-yards, Lower Albina, Portland. Probably introduced from Rocky Mountain region.
17. **Conringia orientalis* (L.) Dumort. With the last, and also along railroad-tracks near Salem.
18. **Roripa Armoracia* (L.) Hitchc. A frequent escape to vacant lots and waste ground in Salem.
19. **Rubus pubescens* Weihe. On a dry shaly bank along the Oregon Electric Railroad at Salem.
20. **Medicago minima* L. In shipyard on old ballast, Linnton, Portland.
21. **Erodium aethiopicum* (Lam.) Brumhard & Thellung. Waste ground in rear of cannery, Salem.
22. **Oxalis corniculata* L. Under rose-bushes on street-parking, Salem.
23. **Hibiscus Trionum* L. In a vegetable-garden, Salem.
24. **Lycopersicum esculentum* L. Frequent in waste places, and occasional on sand-bars along the Willamette River, Salem.
25. **Physalis ixocarpa* Brot. Sandy waste ground in railroad-yards, Lower Albina, Portland. Not found in cultivation.
26. **Mazus rugosus* Lour. Muddy shore of Columbia River on Hayden Island, opposite Vancouver, Wash. Previously collected by Gorman at border of pond in Kenton, Portland. A native of tropical east Asia.
27. *Mimulus floribundus* Lindl. Muddy shore of the Columbia River on Hayden Island, opposite Vancouver, Wash. Noteworthy so near sea-level.
28. *Pentstemon deustus* Dougl. Gravelly shore of the Willamette River, Eugene. Common southward and in eastern Oregon.

29. *Ilysanthes inaequalis* (Walt.) Pennell. On muddy shores of the Willamette River, Salem. Perhaps has been mistaken for *I. dubia* (L.) Barnh.
30. **Orobanche minor* Sm. In shipyard on old ballast, Linnton, Portland.
31. **Rubia tinctorum* L. On street-parking, Salem. Nowhere found in cultivation.
32. **Lonicera Xylosteum* L. Along railroad-track at Mute School, Salem.
33. **Solidago serotina* Ait. var. *gigantea* (Ait.) Gray. Waste ground at old city dump, Salem. A native of the eastern U. S., and frequent here in cultivation.
34. **Centaurea Jacea* L. var. *lacera* Koch. Dry roadside in river-bottom near Orville, Marion Co.

I am again under obligation to Mr. J. F. Macbride for his unwearying kindness in verifying and correcting these determinations. Specimens of all the above have been deposited in the Gray Herbarium, and also in the herbarium of the Philadelphia Academy of Science (naturalized species only).

Mr. S. B. Parish's exhaustive study of the Immigrant Plants of Southern California (Bull. S. Cal. Acad. Sci. 19: Part 4, 3–30. Oct. 1920) affords an interesting contrast between the weed-floras of the two neighboring States. He includes in his list 290 species, and appears to have thoroughly covered his territory; whereas in Western Oregon north of the Umpqua Valley something over 450 introduced species have been reported—and the end is not yet! While the warmer winters of Southern California permit a number of sub-tropical species to gain a foothold that would be unable to survive in Oregon, this advantage is more than offset by the greater aridity of the Californian summer. The climate of Western Oregon is in this respect more nearly like that of Western Europe, and the immigrants from that very weedy region therefore find summer conditions more favorable here than further south, while they escape the severe winters of the Atlantic seaboard. If our Oregon rainfall could be distributed so as to give us a few more inches of precipitation in

the summer months, we might easily become the weed-paradise of the world, and a convincing example of the results of unrestricted immigration!

THE FLORA OF THE TOWN OF SOUTHOLD, LONG ISLAND AND GARDINER'S IELAND

By Steward H. Burnham and Roy A. Latham

(*Continued from January–February* Torreya)

SPERMATOPHYTA

Picea rubens Sarg.—On Gid's Island, July 24, 1920 (Dr. C. S. Gager, N. Taylor & R. Latham). This island does not cover over three acres and is entirely surrounded by salt marshes. Two of the four trees are dead and the other two more than half dead: but there are four little seedlings ten to twenty inches high. Mr. Taylor remarks that these are evidently the last remains of what was once a spruce forest covering the whole island and that they are putting up a losing fight.

Pinus Strobus L.—A colony of nearly 300 trees in a swamp at Greenport; some of the trees actually growing where their roots are submerged a portion of the year. November 1918. Mr. Price, an elderly gentleman, who owns the swamp, says his father told him that they were a true native here. Some of the trees are probably 100 years old. There are eleven trees in dry woods at Southold which may be native. During August 1920 several hundred trees were seen in dry wood-lands at Bay View.

Sparganium androcladon (Engelm.) Morong—Wet place, Gardiner's Island. No. 3433. Sept. 20, 1920.

Potamogeton diversifolius Raf.—In a pond on Gardiner's Island. No. 3427.

**Agrostis altissima* (Walt.) Tuck.—Low marshy ground, rare at Mattituck.

A. perennans (Walt.) Tuck.—Dry soil throughout the town.

Aristida tuberculosa Nutt.—Rare along the railroad track in ashes at Laurel in the western part of the town. It is abundant in sandy soil a few miles further west but outside the town of Southold.

Calamagrostis cinnoides (Muhl.) Scribn.—Not common in low open ground at Mattituck.

Festuca Myuros L.—Wet sandy soil at Mattituck.

F. rubra L.—Orient in rather dry open woods near a salt marsh.

Miscanthus sinensis Anderss.—Occasionally found in waste places and old yards.

Panicularia obtusa (Muhl.) Ktze.—Mattituck in a swamp.

* The grasses were named by Mrs. Agnes Chase of the U. S. Department of Agriculture.

Panicum meridionale Ashe—In dry woods at Cutchogue; determined as *Panicum albemarlense* Ashe.

P. tennesseense Ashe—Southold in sandy soil.

Carex atlantica Bailey—Wet woods at Greenport and Orient; determined by Mr. G. P. Van Eseltine. No. 2285.

C. festucacea Schkr.—Wet open place in woods at Greenport (No. 3518) and at Southold (No. 3530).

Carex laevivaginata (Küken.) Mackenzie—Greenport in wet woods; determined by Mr. Van Eseltine. No. 2288.

C. lanuginosa Mx.—Greenport in a swamp and Orient in wet sandy woods; determined by Mr. Van Eseltine. No. 2339.

C. laxiculmis Schwein.—Frequent in dry open woods at Southold. No. 3524.

C. Swanii (Fernald) Mackenzie—Orient. No. 1101.

Cyperus dentatus Torr.—Wet sandy shores at Laurel. No. 1278 and 3447.

Eleocharis acicularis (L.) R. & S.—Salt marsh, Gardiner's Island (No. 3432) and sandy shore of a pond at Laurel (No. 3469).

Eriophorum virginicum L.—Laurel. No. 1287. Aug. 4, 1918.

Rynchospora alba (L.) Vahl—Laurel. No. 1291.

Spirodela polyrhiza (L.) Schleid.—East Marion (No. 3533) and Greenport. Locally common on woodland pools and ponds: at Greenport abundant'y associated with *Lemna minor* L.

Juncus aristulatus Mx.—Growing in large clumps in a brackish marsh at Orient. Rare. May 30. 1917. No. 1087.

J. tenuis Willd.—Dry hills, Gardiner's Island. July 14, 1918. No. 1260.

Aletris farinosa L.—Laurel. Sept. 10, 1917. No. 1077.

Lilium philadelphicum L.—Open ground between Southold and Great Pond at Peconic. A colony of about 50 plants.

Gymnadeniopsis clavellata (Mx.) Rydb.—Boggy woods at Mattituck. Aug. 28, 1920. No. 3460.

Ibidium gracile (Bigel.) House—Plants having a single stout root were found in dry open ground at Southold. Aug. 20, 1920. No. 3434.

Hicoria ovata (Mill.) Britton—Low woods, Gardiner's Island. No. 3422. Sept. 20, 1920.

Myrica Gale L.—Laurel. Aug. 4, 1918. No. 1288.

Populus heterophylla L.—Greenport in swampy woods. July 25, 1920. The first time Mr. Taylor has seen it wild on Long Island.

Salix Bebbiana Sarg.—Greenport in dry open places. Plants commonly two feet high or less were found on sandy dunes at Southold.

S. cordata Muhl.—In a swamp at Mattituck. June 18, 1920. No. 3521. The leaves little narrower than usual.

S. discolor Muhl.—The var. *eriocephala* (Mx.) Anders. In open places at Greenport (Wm. C. Ferguson); determined by Dr. P. A. Rydberg.

Quercus ilicifolia Wang.—Rare near Laurel in light soil. No. 1268. Aug. 4, 1918. A single plant at Cutchogue; which is the easternmost record for it. The scrub oak becomes abundant about eight miles west of the Southold town limits.

Q. prinoides Willd.—Southold. Sept. 10, 1919. Rare in dry woods at Mattituck and Peconic.

Ulmus fulva Mx.—Wet woods at Greenport. July 20, 1920. No. 3459. Very rare in low woods; several trees in a bunch, which came from the stump of a large tree, cut many years ago.

Morus rubra L.—Was listed previously as probably introduced; but now found to be a native on Gardiner's Island.

Boehmeria Drummondiana Weddell—Laurel. Sept. 10, 1917. No. 1280.

Persicaria opelousiana (Riddell) Small—Swampy woods at Greenport. Aug. 28, 1920. No. 3386.

P. orientalis (L.) Spach.—Occasional in waste grounds and cultivated fields at Greenport and Orient.

Polygonum atlanticum (Robins.) Bickn.—Large bushy plants on sea beaches at Orient. Aug. 20, 1920. No. 3396.

Rumex mexicanus Meisn.—Orient. June 1916. Specimens previously reported as *Rumex pallidus* Bigel. should probably be referred here.

Acnida cannabina L.—Salt marshes at Laurel. Sept. 14, 1918. No. 1313. Specimens previously reported as *Acnida tuberculata* Moq. should probably be referred here.

Chenopodium Botrys L.—Southold (Mrs. F. R. Mitchell); determined by Mr. Taylor.

C. rubrum L.—Beach at Southold (Mrs. Mitchell); determined by Mr. Taylor.

Allionia nyctaginea Mx.—The subspecies *Allionia nyctaginea ovata* (Pursh) Morong. Moist waste ground at Laurel. Sept. 14, 1918. No. 1318.

Cerastium arvense L.—Fields at Southold (Mrs. Mitchell).

Silene stellata (L.) Ait.—Moist woods at Southold. Oct. 19, 1919. No. 4071.

Magnolia tripetala L.—A single tree twenty feet high with trunk diameter of five inches, at the edge of wet woods at Southold. The origin is uncertain, but introduced. Reported to Mr. Latham by Mrs. Mitchell. Oct. 16, 1919. No. 2148.

Cardamine hirsuta L.—Old lawn at Southold (Mrs. Mitchell).

Draba caroliniana Walt.—Sandy soil at western end of Long Beach at Orient. Rare. 23 May–early June, 1920.

Sarracenia purpurea L.—A single plant from a bog near Mattituck.

Agrimonia Bicknellii (Kearney) Rydb.—Rare in dry woods at Southold (Ferguson & Latham); determined by Dr. Rydberg.

A. rostellata Wallr.—Uncommon in dry woodlands at Southold. Oct. 10, 1919. No. 2120.

Potentilla recta L.—Dry roadsides at East Marion. Rare. June 20, 1920. No. 3531.

Amelanchier oblongifolia (T. & G.) Roem.—Not uncommon in dry woods at Cutchogue; determined by Dr. K. M. Wiegand. No. 3407.

Crataegus Arnoldiana Sarg.—Gardiner's Island, frequent at margins of woods in dry or wet soil; determined by Mr. W. W. Eggleston. A thick foliaged, beautiful, round-topped tree about twenty feet high.

Crataegus intricata Lange.—Gardiner's Island; determined by Mr. W. W. Eggleston.

Crataegus intricata Lange.—Gardiner's Island; determined by Mr. W. W Eggleston.

Chamaecrista nictitans (L.) Moench.—Bay View and Southold, locally common. Sept. 1920. No. 3403.

Crotalaria sagittalis L.—Common on a dry sandy ridge at Southold. Aug. 28, 1920. No. 3385.

Lathyrus latifolius L.—A rare escape in dry woods in the vicinity of an old house-site at Cutchogue. Aug. 21, 1920. No. 3399.

Meibomia obtusa (Muhl.) Vahl—Dry hillside, locally common at Southold. Aug. 29, 1920. No. 3395.

M. rigida (L.) Ktze.—Mattituck. Aug. 9, 1918. No. 1284.

Polygala Nuttallii T. & G.—Mattituck. Aug. 9, 1918. No. 1267.

Tithymelus Helioscopia (L.) Hill—Rare in a field at Peconic (Mrs. Smith). Dec. 10, 1920.

T. Ipecacuanhae (L.) Small—Sandy soil at Laurel. Aug. 4, 1918.

Staphylea trifolia L.—Rocky woods, Southold; determined by Mr. Taylor. Aug. 1, 1920. No. 3548.

Hudsonia ericoides L.—Common in one locality at Bay View. Aug. 21, 1920. No. 3400.

Rotala ramosior (L.) Koehne—A small colony in wet sand north of Great Pond, Southold. Oct. 19, 1919. No. 2126.

Myriophyllum humile (Raf.) Morong—Gardiner's Island in a pond. Sept. 20, 1920. No. 3426.

Cicuta bulbifera L.—Mattituck. Aug. 9, 1918. No. 1270.

Cornus Amomum Mill.—Uncommon in rich woods at East Marion (Miss Mabel R. Wiggins); verified by Mr. Taylor.

Chamaedaphne calyculata (L.) Moench—Laurel. Aug. 4, 1918. No. 1269.

Eubotrys racemosa (L.) Nutt.—Wet woods at Southold. Oct. 19, 1919. No. 4068.

Gaulthera procumbens L.—Mattituck.

Neopieris mariana (L.) Britton—Low place in woods at Southold. Sept. 14, 1919. No. 2263. Cutchogue in rich woods. Rare on Fleets Neck, Cutchogue but frequent on Nassau Point.

Gaylussacia frondosa (L.) T. & G.—Dry woods at Mattituck. Aug. 21, 1920. No. 3405.

Asclepias exaltata (L.) Muhl.—Rare in wet woods at Southold, south of Great Pond. July 30, 1920. No. 3565.

Phlox subulata L.—Escaped in old yards at Orient. Sept. 10, 1920. No. 3428.

Lithospermum arvense L.—Field at Southold (Mrs. Mitchell); determined at U. S. Dept. of Agriculture. Dry cultivated field at Bay View. May 1, 1919. No. 2158.

Onosmodium virginianum (L.) DC.—Dry or moist woods at Fleets Neck at Cutchogue. Sept. 14, 1919. No. 2246.

Cunila origanoides (L.) Britton—Very rare in oak woods on Fleets Neck at Cutchogue. Sept. 14, 1919. No. 2262.

Koellia flexuosa (Walt.) MacM.—Dry open woods on Gardiner's Island. Sept. 20, 1920. No. 3424.

K. incana (L.) Ktze.—Common in dry hilly woods at Southold. Oct. 19, 1919. No. 1909.

K. mutica (Mx.) Britton—Dry woods at Southold. Sept. 21, 1919. No. 4052.

Leonurus Cardiaca L.—Waste places at Bay View. Aug. 21, 1920. No. 3413.

Lycopus rubellus Moench—Greenport and Southold in low woods, frequent.

Mentha piperita L.—Roadside at Cuchogue. Oct. 14, 1919. No. 4045.

Stachys hyssopifolia Mx.—Gardiner's Island. July 14, 1918. No. 1258.

Physalis heterophylla Nees—Locally common as a weed in light cultivated soil at Cutchogue. Oct. 4, 1919. No. 4047.

Pentstemon digitalis (Sweet) Nutt.—Rare in dry ground at Southold. Aug. 28, 1920. No. 3384.

Utricularia macrorhiza LeConte—Laurel. Sept. 10, 1917. (*Utricularia vulgaris* of Am. Auth.)

Galium Mollugo L.—Orient. July 15, 1918. No. 125.

G. verum L.—Field at Southold (Mrs. Mitchell).

Viburnum cassinoides L.—Laurel. Sept. 14, 1918. No. 1316. Rich woods at Greenport. Oct. 30, 1920. No. 3451.

Cucurbita Pepo L.—Several specimens growing wild on sand dunes at Southold. Not an uncommon escape on farms and in waste places.

Micrampelis lobata (Mx.) Greene—Orient. Sept. 1, 1918. No. 1310.

Sicyos angulatus L.—Rare in waste places at Greenport.

Hieracium aurantiacum L.—Rich soil along old road in woods at Southold. Sept. 29, 1920. No. 3465.

H. marianum Willd.—Dry soil at Southold (Mrs. Mitchell).

Lactuca canadensis L.—The var. *integrifolia* (Bigel.) Gray in dry woods at Cutchogue (No. 3398), Aug. 15, 1920; and Orient (No. 1335), Sept. 30, 1918. This includes the previously reported *L. canadensis* v. *montana* Britton and *Lactuca sagittifolia* Ell.

Lactuca Scariola L.—Dry woods at Bay View. Sept. 5, 1920. No. 3436. Also the var. *integrata* Gren. & Godr. in sandy places at Orient. Sept. 15, 1920. No. 3418.

Nabalus trifoliolatus Cass., var. **obovatus** var. nov. Leaves purplish, membranous, obovate or oblanceolate, or deltoid, acute, on margined petioles, slightly denticulate or entire. Moist woods at Orient. Oct. 1919. No. 3375. Plants with deltoid leaves were found in dry ground at Bay View. Aug. 29, 1920. No. 3446.

Aster laevis L.—The var. *amplifolius* Porter is rare along wet margins of woods at Orient. Oct. 11, 1919. No. 2201.

A. Lowrieanus Porter—Uncommon in rich woodlands at Greenport and Orient (Mr. Ferguson); verified at the N. Y. Bot. Garden.

A. vimineus Lam.—Dry or wet soil in fields at Gardiner's Island. Sept. 19, 1920. No. 3421.

Centaurea maculosa Lam.—Dry fields at Cutchogue. Oct. 19, 1919. No. 2111.

C. nigra L.—The var. *radiata* DC. in dry pastures at Cutchogue. Oct. 19, 1919. No. 2110.

C. solstitialis L.—Field at Southold (Mrs. Mitchell); determined at U. S. Dept. of Agriculture.

Cirsium muticum Mx.—Gardiner's Island in wet woods. Sept. 20, 1920. No. 3429.

Lacinaria scariosa (L.) Hill.—A single plant in dry woods at Fleets Neck, Cutchogue. Sept. 14, 1919. No. 2245.
Solidago ulmifolia Muhl.—Dry hillside at Southold. Sept. 1, 1920. No. 3394.

BOOK REVIEW

Hardy's Geography of Plants*

The author of this comparatively short volume has dared much in attempting to write a brief account of the plant geography of the earth. In most works devoted to the subject authors are usually content to describe the different plant societies, such as forests, grasslands, and the like and mention a few well-known examples of each in the different countries. Schimper's monumental book on plant geography is built on this plan, but the author of the book under review boldly adopts the more interesting, if somewhat hazardous, method of taking the different continents one at a time and briefly describing the vegetation of each.

It is obviously impossible to give in a short review the scope of the book, for to do so would involve useless repetition of material from the book itself, and it were better for the prospective reader to go directly to the source. No other book in English comes within measurable distance of doing so well what it attempts to do. For here both the botanist and intelligent layman will find in plain English a readable account of the vegetation of the different parts of the earth.

So far as our own continent is concerned the treatment is all that one could expect in a book admittedly general in its scope. The different forest and grassland and desert regions of the continent are dealt with in some detail, but the chief value of the book is that it gives to those who will not or often cannot take the time to study more special works, a clear, readable, and judging by the account of our own vegetation, a reasonably accurate description of the vegetation of the earth. No specialist will go to such a book for his information, but the general botanical reader may be congratulated upon having in it the best short account of the subject that has appeared.

Norman Taylor

* Hardy, M. E. The geography of plants. Pp. 1–327. Oxford University Press, 1920. Price $3.00.

NEW SPECIES OF SOUTH AMERICAN PLANTS*

By Francis W. Pennell

Since 1893, Professor Henry H. Rusby has been publishing descriptions of new species of South American plants. It has been Dr. Rusby's good fortune to collect in Chile, Bolivia, Brazil, Venezuela and Colombia, and to have had the privilege of studying the collections of Mandon, Bang, Williams and Buchtien, from Bolivia and of Herbert H. Smith from Colombia.

Before setting out with the reviewer upon their joint expedition in 1917 to central Colombia, it had been Dr. Rusby's wish to complete the study of the older collections which had been accumulating under his care. The present paper is the deferred accomplishment of this and lays before us 292 new species, 172 from Colombia, 85 from Bolivia, 29 from Venezuela, 3 each from Peru and Brazil. The Colombian species are nearly all from the Smith collection made in the Department of Magdalena, only one, and that entered with doubt, being from our own trip. The Bolivian species are mostly of Buchtien's, Bang's and Williams' collecting, the describer's own plants having been long ago studied. But the Venezuela species are from the expedition of Rusby and Squires in 1896, one which has heretofore been too little cited.

The descriptions appear ample, and specimens are uniformly cited, rarely more than one to a species, thus rendering of small importance the rarity of the use of the word "type." In five instances however species are named for collectors other than those whose specimens have been fully listed and apparently used for description, so that the reader is left in doubt as to which plant should be counted type. The study is attractively presented, on good paper and in clear type, and such a venture, at the author's own expense, deserves more than a passing regard.

At its close the paper contains an index to the genera under which South American species are described in this and all the

* H. H. Rusby, Descriptions of Three Hundred New Species of South American Plants, pp. 1–170, Dec. 20, 1920. Published by the author, 115 W. 68th St., New York City. $2.50.

previously published papers by the same author. Thus this paper concludes definitely the past period of Dr. Rusby's activity, and we look forward to the new specimens and the new observations to be brought us from his projected extensive South American journey of 1921.

PROCEEDINGS OF THE CLUB

The meeting of May 11 was held at the American Museum of Natural History.

J. C. Nelson was elected to membership.

The special program of the evening consisted of an illustrated lecture on Dahlias by Dr. Marshall A. Howe. The speaker sketched the early history of the dahlia referring to its introduction into Europe from Mexico in 1789. A series of lantern slides showed dahlias in their native haunts in Mexico and Guatamala and numerous modern varieties under cultivation at the New York Botanical Garden and elsewhere. The best methods of cultivation and propagation were discussed. The main substance of the discussion may be found in an article published by the speaker in the Journal of the Horticultural Society of New York for February, 1919.

Meeting of May 26

The meeting was held at the Morphological Laboratory of the New York Botanical Garden.

The following were elected to membership in the club: Ira W. Clokey, Frederick Dawson, George A. King, Miss Dorothy Oak, and Charles P. Smith.

The secretary announced the death on April 23 of Miss Mary S. Andrews, a member of the club, and read the following article of her will: "I give and bequeath unto the Torrey Botanical Club, a corporation organized and existing under the laws of the state of New York, the sum of one thousand dollars ($1,000) to be used by it in such research work as from time to time shall seem advisable to a majority of the then board of trustees of the Club."

The first part of the scientific program was by Dr. John K. Small, "Notes on a Recent Trip to Florida." The second item of the program was a preliminary report of a trip to Trinidad by Dr. N. L. Britton, illustrated by interesting specimens, including the fruits of various tropical trees, shubs and vines and a series of fossil leaves from a bed of plant remains sixty feet thick. Dr. Liberty Hyde Bailey then gave an entertaining and instructive account of his recent experiences in travelling and botanizing in China.

Meeting of October 12

The meeting was held in the botanical laboratory of Schermerhorn Hall, Columbia University.

The following were elected to membership: Miss Eliza Frances Andrews, Prof. Forman T. McLean, H. Nordheim, G. G. Orphal, H. E. Piaget, Dr. W. A. Setchell, Wilhelm Suksdorf, Raymond H. Torrey, Mrs. Arthur E. Sproul.

The evening's program consisted of short reports by members of their botanical experiences during the summer. Prof. R. A. Harper spoke of his experiments in growing various sorts of maize. Dr. J. A. Harris told of his explorations in Utah and of the study of the osmotic concentration of cell-sap of desert plants. Dr. Michael Levine had continued his investigations of crown-gall, this year obtaining interesting results with beets. Dr. B. O. Dodge told of his culture of various parasitic fungi, and Mr. Alexander Gershoy of his studies of cleistogamy in violets. Dr. Alfred Gundersen had been in the Catskills and noted the contrast in vegetation on different slopes. The president of the club had been in Bermuda, and the secretary in Texas and the Pocono region of Pennsylvania. The fullest report was by Dr. T. E. Hazen. In the spring he was with Dr. Britton's party in Trinidad, but he told us chiefly of his visit during the summer to northern Europe, especially to Norway. Two of his most unexpected results were the obtaining of the organism causing "red snow" in Norway and the discovery of a new and interesting species of the same family in the vicinity of London.

The Torrey Botanical Club

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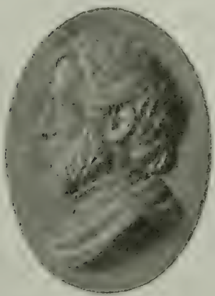
EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS



JOHN TORREY, 1796–1873.

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May–June, 1921

THE PHYLLOTAXY OF PHOENIX CANARIENSIS

By Cornelius Beach Bradley

Date palms of this species are frequently grown as ornamental trees in and about Berkeley, California. They are mostly young trees that are approaching maturity or have recently attained it. As the leaves grow old and bend low toward the ground, they are generally lopped off to get them out of the way, leaving the stumps however in place on the trunk. Since these stumps persist for years, they build up in time an authentic record of the development and arrangement of the leaves, complete save where accident or decay has marred it, and save also that it does not include the earliest period of growth; for through the enormous expansion of the trunk during that stage, all the earliest leaves are torn from their attachments and lost long before the regular trimming of the leaves begins. This record of the leaf-stumps was found to be of very great assistance in working out the phyllotaxy of the tree, and is frequently cited as "the record" in the discussion which follows.

I

1. A preliminary survey made it evident that the problem here presented is not by any means the simple one usually encountered in a study of this kind, namely, the deciphering of a single and a stable pattern, and the identification of it with one of the "regular" patterns described in the textbooks. On the contrary, all the ordinary clues were here completely lost in a maze of uncertainty caused by constant change of pattern. Only at a single point between infancy and maturity was there a pause where the wheeling ranks stood still long enough to be counted. Never before had the writer encountered anything of this sort, nor from

his early reading of the authorities could he recall so much as a suggestion that such things ever occur.* Here then was a challenge which could not be ignored or neglected.

2. After careful examination of many specimens it became clear that each tree of this species has passed through several distinct phases of phyllotaxy, namely: (1) The initial pattern of infancy, not included in the record, and at this stage not yet identified, but later found to be of the 5-ranked pattern (cf. Chart, Zone I). (2) At an uncertain distance above this the record begins in the midst of a zone of no recognizable pattern whatever, because it offers no vertical alignments to form the basis of a numbered scheme (cf. Chart, Zone II). (3) Near the upper edge of this zone, out of what is apparently mere confusion, there presently emerges a recognizable group of oblique spiral ranks which, curving sharply upward, presently reach verticality. There are thirteen of these ranks—so now we know where we stand, though not as yet just how we got there (cf. Chart, Zone III). (4) This vertical alignment sometimes continues unchanged through a space of several feet. Quite as frequently, however, the thirteen ranks merely touch verticality and then gradually swerve away from it. But in either case they do not lose themselves in confusion like that from which they emerged at first.* For here the 13-ranked pattern in its entirety is visibly carried forward along these curves without dislocation or change, save that the whole is slightly tilted in conformity with their deflection (cf. Chart, Zone IV). (5) This gradual rotation of the pat-

* In the writer's student days the botanical authorities within his reach had very little to say concerning deviations from the regular series of leaf-patterns except as the deviations were the result of seasonal changes in the growth of the plant, or of modification of leaves to subserve new functions. Since then it has not been possible for him to follow up the later developments of phyllotactic theory. While acknowledging the seriousness of this handicap for the present task, he still ventures to think that in one way this may not have been wholly a disadvantage—it has at least left him free from theoretical bias to deal with the facts as he found them.

* This double curve of the 13's, with its two arms meeting in Zone III, is the most noticeable feature of the whole record and a valuable landmark for the investigator. Its curvature is always convex toward the direction of the primary spiral. Cf. Section III, 3 *infra*.

tern presently brings into play a new alignment of thirty-four vertical ranks, forming a pattern familiar to Californians in the cones of *Pinus Sabiniana* and *P. Jeffreyi* (cf. Chart, Zone V). For a long time no further change was discovered beyond this point.

3. The appearance of fruit at this stage marks the attainment of maturity, and since during this portion of the study no indication of further change appeared, it was tentatively assumed that the 34-ranked pattern was final. Not until after the study was supposedly complete and the paper was actually in the Editor's hands, did the writer discover that in a few older trees the bending to one side of the thirteen ranks is carried beyond the point at which the 34-ranked alignment becomes vertical, being continued in some instances until the 55-ranked scheme is passed, and the 21-ranked scheme is reached. Whether this is or is not the final scheme, cannot yet be affirmed. Meantime it has not been thought necessary to reconstruct the Chart or to discuss the matter further here.

II

Thus in the phyllotaxy of this tree there are seen to be at least five distinct phases, namely: three of well-known "regular" patterns, while two different groupings of leaves showing none of the recognized alignments occupy the intervals between them. Leaf-development, however, is perfectly continuous throughout the whole series; nowhere is there node or break of any sort. Each of the undescribed arrangements grows directly out of the pattern below it, and grows directly into the pattern above it. Obviously these are organic transformations. What is the essential factor in the process, and how does it work out these changes?

1. In all these patterns, regular and irregular alike, four elements are absolutely constant, namely: (*a*) The primary spiral of growth; (*b*) its direction, left or right; (*c*) the axis about which it coils; and (*d*) its division into equal parts by applying to it a constant unit of measurement, namely, the circumferential arc of 360 degrees, or one turn about the axis. The only other

element in the whole system is the leaf-interval, or rather the interfoliar arc; for it is not a linear dimension measurable on the surface, but an arc measured by the angle at the center. This arc thus becomes a second unit of measurement applied to the primary spiral along with the other. When these two arcs are commensurable, by virtue of their coincidence at regular intervals, they gradually build up those systems of vertical ranks by which we recognize the "regular" patterns. Each of these has its own dimensions of arc, and only so long as the dimension remains constant is the pattern identifiable.

2. Our transition zones then are areas in which gradual change in the interfoliar arc operates to rearrange one of the regular patterns, building up out of it the transitional formation, and out of that again the next regular pattern of the series. What at first seemed to be mere disorder and confusion, turns out to be a marvel of order and symmetry when once its method and structure are understood.

3. Let us assume that the primary spiral is a right-hand one like that in the chart. Any increase of the leaf-interval will set each successive leaf a little beyond—*i.e.*, to the right of—the place where it would otherwise have been. If the increase continues, it will presently cause the vertical ranks of the pattern to swerve visibly to the right—toward the direction of the primary spiral. On the other hand, any diminution of the interval will set each successive leaf a little behind—to the left—of what would otherwise have been its place; and the vertical ranks will then swerve to the left, or away from the primary spiral. In either case all the other alignments of the pattern will be similarly affected, though in less degree the further they are removed from verticality. The whole pattern thus undergoes a sort of rotation to right or to left as the case may be; and this, if continued, will gradually swing into verticality some one or other of the ranks which were secondary spirals of the original pattern. Whenever the predestined secondary rank thus becomes vertical, further change in the leaf-interval is brought to an end as we have seen, and the transformation is complete. The whole proc-

ess may be followed in detail in sections II and IV of the Chart. If the primary spiral were a left-hand one, all of these features would of course be reversed.

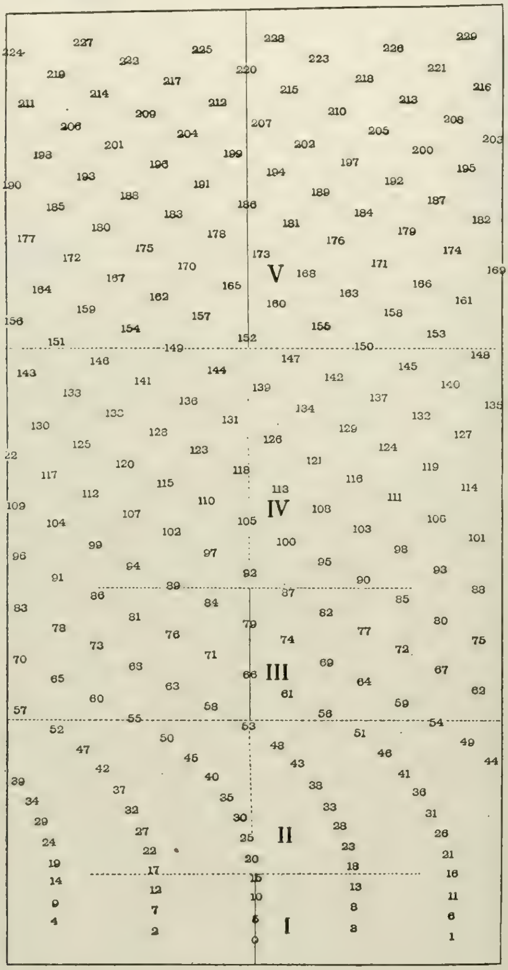
4. The actual amount of change in the interfoliar arc required in order to accomplish these transformations is astonishingly small. The dimensions of the arcs of the three regular patterns with which we are here concerned are given—as fractions of the circumference—in the very formulas by which we distinguish them, namely, $2/5$, $5/13$, and $13/34$. The change required to accomplish the first transition is therefore the difference between the first and second of these fractions; and to accomplish the second, the difference between the second and third. Reduced to decimal form these fractions become 0.400, 0.3846, and 0.3823; and the differences are 0.0154 and 0.0023—the latter amounting only to three fourth of a degree of arc, or one seventh of the minute-interval on the face of a watch. Yet this infinitesimal quantity must be subdivided and distributed over perhaps half a hundred leaf-intervals! *De minimis curat Natura.*

It may seem difficult to account for decrease in the interfoliar arc while the girth of the tree is rapidly increasing. But greater girth simply means larger surface for the insertion of more leaves; and in the case of an endogenous and branchless tree like our palm, it is imperative that no space be wasted—that the growing leaves be crowded together as closely as they can be made to stand. Such being the case, so long as increase in girth keeps ahead of the demand for foot-space for larger leaves, the record will indicate that fact in a changing pattern; because even a constant space on an increasing circumference subtends a diminishing angle at the center. If demand for foot-space catches up with increase of girth, that fact will appear as a pause in the shifting ranks. If increase again gets ahead, change will begin again. If finally equilibrium is established, the pattern reached at that point becomes permanent, and with it the interfoliar arc. Such in brief seems to be the explanation of the strange metamorphoses we have been watching.*

*Among later theories concerning changes in leaf-patterns to which the writer's attention has been kindly directed by the editor of TORREYA, the one

III

The actual sequence of the various parts of this study can perhaps be best understood by following a brief detail of the construction of the Chart.



1. After drawing throughout the field of the Chart the lines of a right-hand primary spiral as the basis of further operations,

which most nearly approximates in its calculated results to the scheme actually presented in our Phoenix is Weisse's Mechanical Theory of Transition, in Goebel's Organography of Plants, translated by Balfour, 1900, Vol. I, p. 74 *ff.*

the thirty-four vertical ranks and the right- and left-hand secondaries of Zone V were plotted at the top. Below this—but with a gap between left for the as yet undeciphered transition—there was made a similar plot of the thirteen-ranked Zone III. These were the only portions of the record so far positively identified and understood. All else was uncertain.

2. The bridge between these two was obviously the next thing to attack. For not only were both its abutments already in place, but the whole record of its construction was there in plain view on the trunk of almost every adult tree of its kind, though as yet we could not read it. All attempts however to devise a scheme which should result in a pattern at all like that of the record were unavailing, until at last the significance of the increasing pitch of the 13-ranked secondaries as they curve downward from Zone V was apprehended.* They curve in order to meet and merge themselves tangentially in the vertical ranks of Zone III. After that it was not difficult to discover the right curve and to plot the girders which were to connect the abutments of the bridge. Leaf-stations then were marked throughout the three zones, and lines of provisional numbering were established as basis for the final numbering of the whole when the plot of Zones I and II should be completed. Thus plotted, the result was not only intelligible, but—what was far more important—it actually represented what was seen in the record of the tree.

3. There still remained Zones I and II. By this time it had been ascertained that the leaf-pattern of the first is 5-ranked, and that it lasts but a very short time before passing into the transition of Zone II. So a narrow zone of that pattern was plotted at a suitable distance below Zone III, and the transition was accomplished precisely as it was in Zone IV above—by bringing down the 5-ranked secondaries of III on a curve which finally merged them in the verticals of Zone I. Leaf-stations were then plotted throughout these two areas, and permanent numbering was established throughout the Chart.

4. The reader of course will not imagine that the broad open

* See in Plate I the descending curve between Nos. 190 and 112, and in Plate II between Nos. 148 and 96.

spaces of the lower portion of the Chart represent at all what would be actually seen on the stem of the infant tree. At the beginning of its growth the five ascending leaf-ranks, instead of being widely separated as shown in the Chart, stand in actual contact about the slender stem—and continue so throughout the life of the tree. The problem of the Chart, however, is not one of dimension, but of alignment; and for that, Mercator's projection has the great advantage of representing all lines of *constant* direction as *straight* lines on a plane surface, and not as conical or conoidal spirals, which all of them save the verticals actually are.

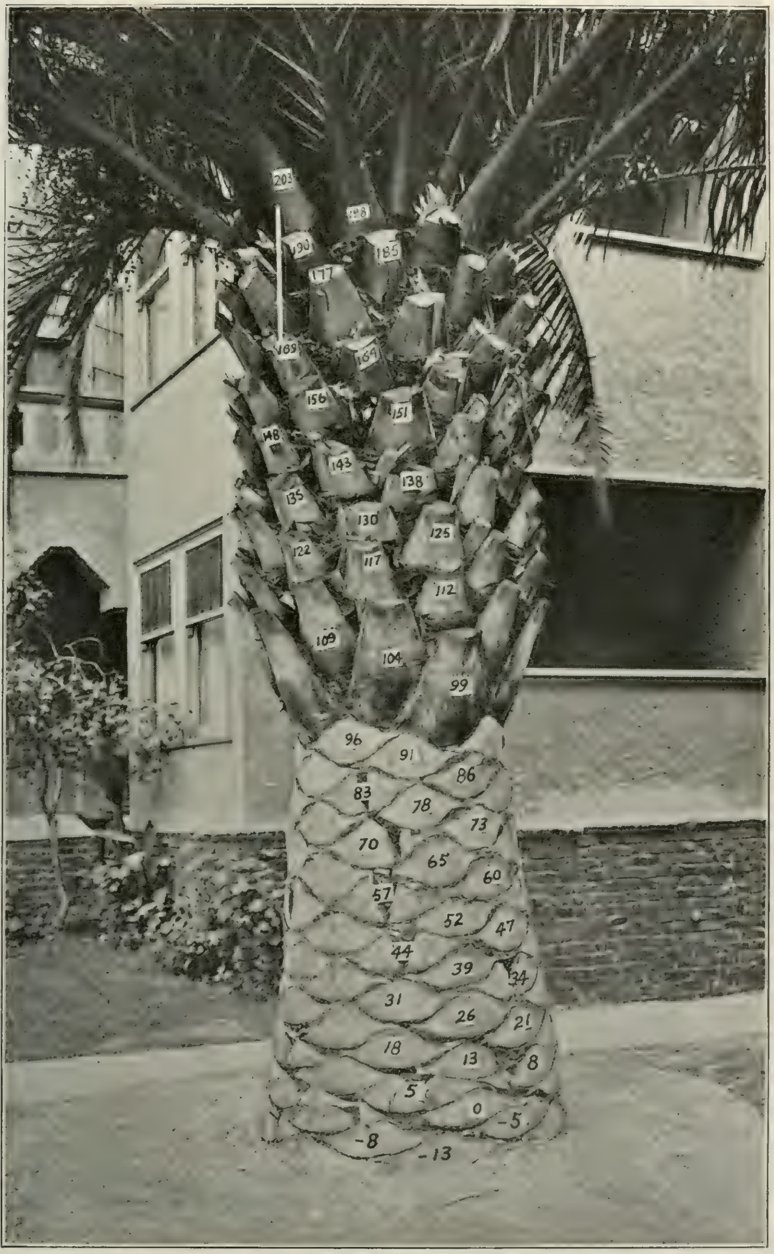
Within the limits of this short paper it has not been possible to attempt more than a demonstration of the fact and the method of orderly phyllotactic transition from one of the established patterns to another. The many and larger questions which grow out of this study must await further study.

Note.—Concerning these the writer will be glad to receive suggestions from any one interested in these matters. His address is 2639 Durant Ave., Berkeley, Cal.

Explanation of the Plates.

Plate I. *Phoenix Canariensis*, with right-hand primary spiral—clean-shaven below and with fruit-clusters appearing above among the leaves. All traces of Zones I and II have perished, save that a few leaf-scars from the upper edge of II are still visible just at the surface of the ground (Nos. –8, –13, –5). These are the upper ends of 13-ranked secondaries curving sharply upward from the transition zone below to become the vertical ranks of Zone III. Rising obliquely right and left are the 8-ranked and the 5-ranked secondaries, the former having the steeper pitch. At the level of leaf 52 the vertical ranks began to incline toward the left, as they enter the transition of Zone IV; causing the grade of the 8's to become a little steeper, and that of the 5's to become less steep, as the rotation progresses. At the level of leaves 164–169 the transition comes to an end, and the 34-ranked regular pattern begins so that leaves 198 and 203 stand vertically above the two last named.

Plate II. *Phoenix Canariensis*, with left-hand primary spiral, reversing all the alignments of Plate I, and showing a much lower section of the record than is commonly preserved—Zones II (in part), III, IV, and the lower edge of V. The great curve of the 13's is strikingly shown in its continuous form, without pause at verticality in Zone III, and convex toward the left, turning at about the level of leaves 101–104 into the transition of Zone V. Within the crown of leaves, above, Nos. 161 and 156 may be seen vertically placed above Nos. 127 and 122. Zones III and IV are here much more condensed than in Plate I.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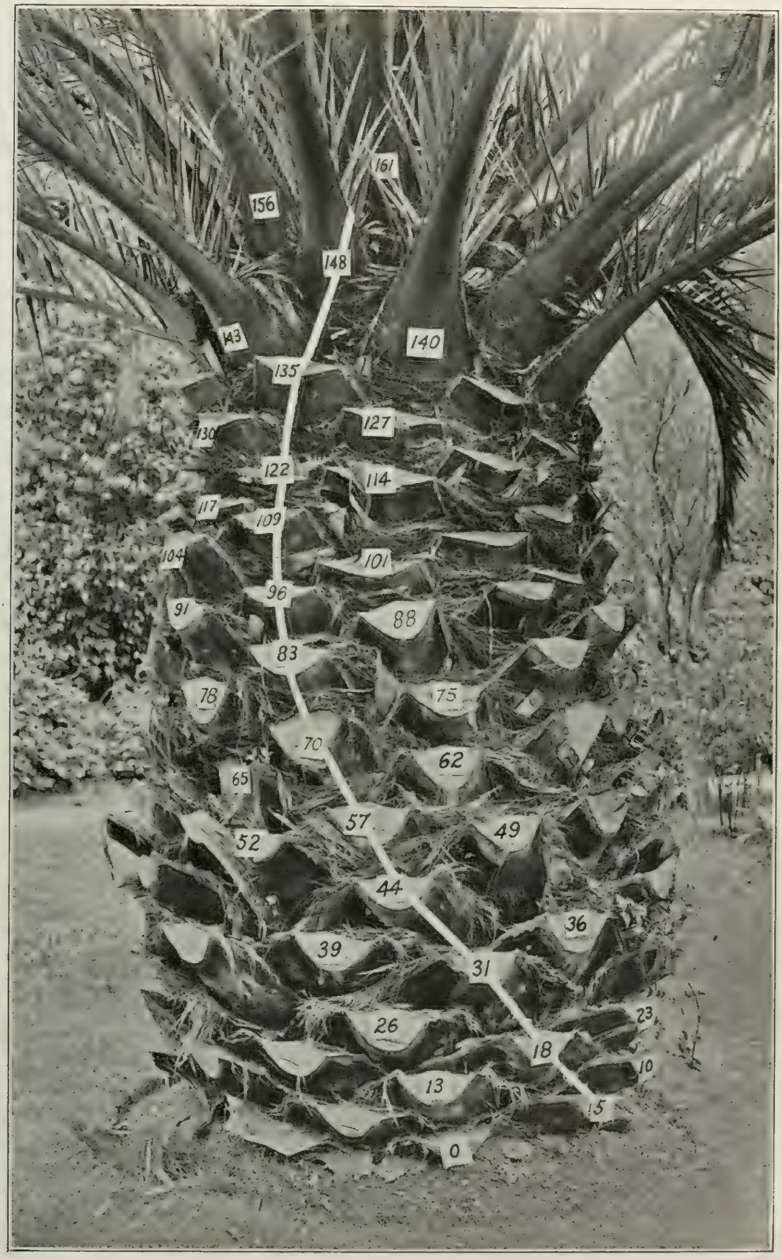
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A METHOD OF TEACHING THE EVOLUTION OF THE LAND PLANTS

By B. W. Wells.

One of the bêtes noires of elementary botany instruction is the problem of getting across the story of land plant evolution with its complications arising out of the alternation-of-generations situation. I suppose it is safe to say that the majority of students who survive freshman botany do not really grasp the facts of the complete reversal in the food relations of the two generations, the progressive differentiation associated with sex and other fundamental generalities which are familiar to the advanced botanical student.

This failure is primarily due to the fact that the types are taken up one at a time with no genuine opportunity afforded to bring all of the significant types together so they may be automatically compared; for only the comparative method constitutes the vital approach to such an evolutionary problem.

The writer a number of years ago overcame in great part the above mentioned weakness in his teaching by introducing the concentric method of handling the life cycles.

Professor J. H. Schaffner, of Ohio State University, first used the diagrammatic method of presenting the life history of plants by arranging the significant stages at intervals in a circle. These intervals are marked out by radii. And those used by the writer are the ones suggested by him in his Laboratory Guide.

The writer's adaptation of Schaffner's method is involved in requiring the student to draw the life cycles of the type plants in a concentric manner, the lowest in the scale of evolution at the center, the next higher around this, and so on. For this purpose they are furnished a large durable sheet of paper, such as an unfolded genus cover. After the student has finished his laboratory and text study of a liverwort (preferably *Ricciocarpus*) he is introduced to the life cycle method by furnishing him the necessary sketches or the finished cycle, which he is at liberty to copy

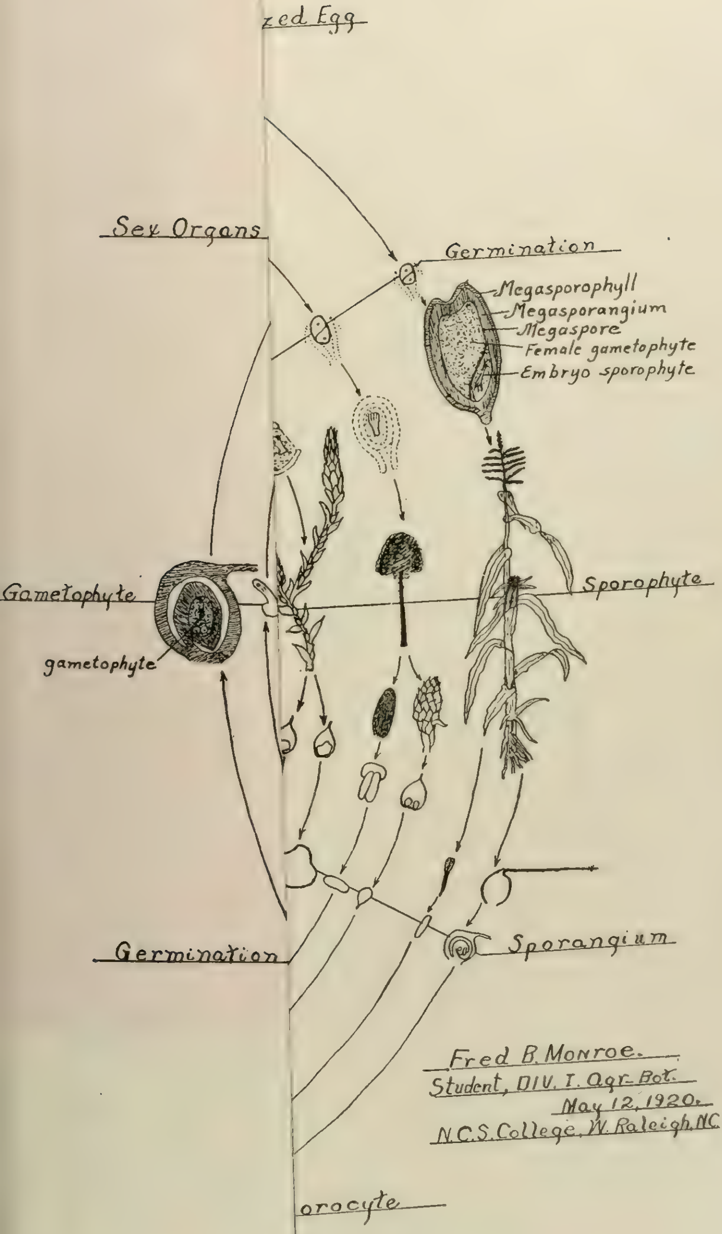
on the innermost guide circle of his large sheet. (The student should have previously drawn lightly the proper number of radii and circles to take care of the types to be offered.) It is well to similarly assist the student with his second cycle until he "catches" the idea. After that he goes it alone. Acquiring his data from all possible sources he organizes it on his sheet where he cannot escape comparing the stages with those of preceding types, with the delightful result that a goodly proportion of the learners really "get the big idea" which is intended for them.

The accompanying plate is the work of an unassisted student, Mr. Fred B. Monroe. Above all it is important that the *students* make this little chart; for the instructor to make a large one (wall chart size) to be used as a basis for mastering the situation would be an unfortunate pedagogical error.

A few comments on some of the desirable features may not be out of place. Homologous structures are on the radii: Opposite radii show contrasting conditions in the two generations, viz., sporophyte *vs.* gametophyte; fertilization *vs.* reduction; sex organs *vs.* sporangia, etc.; on the right of the heavy diagonal line sporophyte structures ($2x$ number of chromosomes) are diagrammed; on the left gametophytic ones (x number of chromosomes). Passing outward along a radius gives a summary of the evolutionary changes in that structure, the sporophyte and gametophyte radii, of course, being of the most significance.

In the higher land plants in which sporophyte and gametophyte tissues remain together it is desirable to indicate this in the drawings on some of the radii by carrying the structures over the dividing line between the generations, differentiating them from each other by drawing one with dotted lines or handling them with different colored inks. Further, as shown in the student's diagram it is desirable to introduce the seed (or grain in the case of corn) in its proper place, diagramming its parts and thus summing up the life cycle structures as they are actually "summed up" in the seed.

The plate as presented is by no means perfect and should not be understood as showing all of the possibilities of the method.


zed Egg
Sex Organs
Germination
Megasporophyll
Megasporangium
Megaspore
Female gametophyte
Embryo sporophyte
Gametophyte
gametophyte
Sporophyte
Germination
Sporangium
Fred B. Monroe.
Student, DIV. I. Agr. Bot.
May 12, 1920.
N.C.S. College, W. Raleigh, NC
orocyte

Attention Scanner:
Foldout in Book!

Improvements and variations may be easily made by the instructor. I preferred to use this production of a freshman student, for it indicates how far a youthful mind can go, provided it is given a logical start.

In conclusion let me assure my readers that by the above method in which the student is given a chance to construct something (and all students enjoy making something grow) that that veritable terror of alternation-of-generations in the land plants has lost his Stygian aspect; in fact the writer personally enjoys nothing more than directing working mentalities as they solve this problem for themselves.

North Carolina State College,
Raleigh, N. C.

A STRANGE FRUIT

By H. H. Rusby.

Jarilla Sesseana (Ramirez) Rusby (*Mocinna heterophylla,* var. *Sesseana* Ramirez, *Anales Inst. Med. Nac.* **1**: 207, t's 3–4 (1894); not *Mocinna* of Lagasca (1816), of Bentham (1839), nor of Cervantes (1885).

On a day in late summer, while traveling through the mountains of the Mexican table-land, near Empalma de Gonzales, one of my peons brought me a fruit of very curious form, calling it *Jarilla* (meaning "little jar") and stating that it was very good. Since he had separated it from its stem, I mistook its base for its summit, and was for a moment quite confused as to its morphology. About as large as a small canteloupe, and of an ovoid form, its elongated and thickened accrescent style looks not unlike a peduncle, this impression being strengthened by the appearance at the other end of five elongated and fleshy, curved appendages which could well be five ascending accrescent superior calyx-lobes, were it not for the fact that in reality they are basal, and recurved about the summit of an elongated peduncle, the stump of which I had mistaken for the style. These appendages are

confluent at their bases to form a rim, enclosing a large concavity, in the center of which the peduncle is attached. The fruit is one-celled, but the cavity is nearly filled (in the half-ripe state in which I saw it) with innumerable seeds a little like small cucumber seeds, originating from 5 placentae and borne on very long funiculi. The seeds have a fleshy outer covering that seems to be

The Jarilla (*Jarilli Sesseana* (Ramirez) Rusby). Copied after Ramirez (*Ann. Inst. Med. Nac.*, 1, Lam. iv.)

a sort of aril, beneath which the surface is rugose. This covering, the fleshy funicles and the placentae, are said to be eaten. I could gain no adequate idea of the flavor or other edible qualities from the ignorant peon, but I found the anomalous form and structure of the fruit sufficiently interesting. The floral characters, and those of the plant itself, are not less so. The herbaceous, prostrate or reclining milky-juiced stems, approximating a yard in length, are produced from a large tuberous rhizome, and are hollow, fleshy and juicy. The leaves are alternate, smooth, glaucous beneath, somewhat triangulate, the margin varying from sinuate to 3-lobed, and palmately 3–5 nerved. Those of the female plant have a large light blotch on the upper surface. The small lilac or violet tubular flowers exhibit remarkable differences in the two sexes, the most striking of which is the alternation of the petals with the calyx-lobes in the pistillate flower, while they are anteposed in the staminate.

Since the plant appears never to have been described in English, an abridged translation of Ramirez' description is here given, in addition to the above notes.

Largest leaves with blade 5 or 6 cm. long, by 3.5 or 4 cm. wide, the petioles as long as the blade, nearly horizontal and cylindrical, with a branch and an inflorescence in each axil. Inflorescence a subdichotomus raceme in the male plant, solitary in the female.

Staminate Flowers.—Calyx very small, 5-fid, the lobes triangular, opposite those of the corolla, lightly rose-colored at the margin. Corolla light-purple, funnel-form, with variable praefloration, the tube lightly narrowed upward and with a few hairs within, below the throat, the lobes oblong. Stamens 10, introrse, inserted in the throat, their summits all at the same level, the filaments united at the base, five of them very short and opposite the corolla-lobes, the alternate ones much longer, the anthers basifixed, those with short filaments longer, longitudinally dehiscent. The large connective forms a margin for the posterior surface and projects above, and is hairy. Rudimentary ovary filiform.

Pistillate Flowers.—Peduncle 4.5 cm. long, bearing two or three bracts. Calyx as in the staminate, but the lobes alternating

with the petals, which are oblong with a small dilatation at the base. Stamens none. Ovary ovoid, one-celled, five-lobed, bearing five fleshy accrescent prolongations at the base, alternate with the stigmas and lobes of the ovary, and opposite and covering the petals at the base. Placentae five, the numerous ovules inserted on long funicles. Style small, accrescent, the stigmas five, papillose, at first horizontal then ascending.

Berry one-celled, ellipsoidal, with the basal appendages and style accrescent, the former enclosing a basal concavity. Seeds numerous, rugose after the separation of the sarcotesta. Embryo straight. Cotyledons plane, the caulicle apparent and cylindrical. Endosperm abundant, peripheral. Funicles spongy, filling the cavity of the ovary. The fruit, when cut, exhales the odor of lemon and citron.

Flowers from June to September. The plant occurs at various places in Jallisco and Guanajuata.

The difference between this and *J. heterophylla* (*Mocinna heterophylla* Cerv. ex. La Llave) appear to me clearly specific.

REVIEWS

Sturtevant's Notes on Edible Plants*

When, six years previous to his death in 1893, Dr. E. Lewis Sturtevant, the distinguished first Director of the New York Agricultural Experiment Station at Geneva, retired to private life, he left at the Station a voluminous series of notes comprising a compilation of then-existing knowledge concerning the edible plants of the world. For twenty years this valuable manuscript, the work of nearly a quarter of a century on the part of Dr. Sturtevant, remained untouched. Now, thanks to the able efforts of Dr. Hedrick, Sturtevant's Notes are made available in what, without question, represents one of the most generally useful reports ever issued by a State Agricultural Experiment Station.

* Hedrick, U. P., Sturtevant's Notes on Edible Plants. Pp. vii + 686, Report New York Agricultural Experiment Station, 1919, Pt. II. Also Twenty-seventh Ann. Rep. New York State Dept. Agr., Albany, Vol. 2, Part 2, 1919.

The difficulty of securing precise and reliable information regarding the origin and history of cultivated plants is appreciated by all who have made the attempt. For the most part, the data of this sort contained in readily accessible works is exceedingly scanty and too frequently it is of doubtful accuracy. Hitherto the works of De Candolle have been regarded as the most authoritative source of information along these lines; but De Candolle gives the origin of barely 250 cultivated plants. The present volume lists nearly 3,000 species of plants which may be used for food, most of them cultivated, and especial stress is laid on their origins and histories. Of particular value in this connection are the copious references to the literature, upwards of 6,000 separate citations being given, and nearly 500 different titles being quoted in the bibliography.

Bringing together, as it does, and making available for convenient reference a vast body of facts relative to edible plants, gathered from many widely scattered and often virtually inaccessible sources, Sturtevant's work would be of great value if only as a compilation or compendium of existing knowledge. But the book is more than a compilation: it embodies many original observations on the part of the author—facts not before brought to light and new points of view regarding facts already known. The original home of many esculents is here definitely recorded for the first time; new landmarks in the history of edible plants are pointed out and much new information is brought forth regarding the history of plants, especially those of the New World; fresh observations are presented regarding variations in plants induced by cultivation; and many data are set down that will throw light on various problems of plant geography and acclimatization.

The subject-matter in the text is arranged alphabetically, by genera and species, the *Index Kewensis* being taken as the standard of nomenclature. Following the scientific name, for each genus, is the natural family to which it belongs; for each species, one or more of the English common names. The descriptive matter, which varies in length from a single printed line to as

many as eight pages, ordinarily takes into account the nature of the plant in question, the various characteristics of the edible portion and how it is prepared for eating, its native home, and its history as a cultivated plant. The work concludes with an index to synonyms and one to the common names.

The Notes as published, while based primarily on the manuscript already mentioned, include in addition much material taken from other writings of Sturtevant, both published and unpublished, and due credit must be given to Dr. Hedrick for the efficient manner in which he has completed his arduous editorial task.

GEORGE E. NICHOLS

PROCEEDINGS OF THE CLUB

MEETING OF OCTOBER 27

The meeting was held at the New York Botanical Garden.

The following were elected to membership: Charles Drechsler, A. J. Riker.

The chief item of the program was a discussion by Mr. Henry Bird on "The Production of Acid Soil by Artificial Means." Mr. Bird became interested in this problem as a means of keeping various acid-loving plants alive to serve as insect-food. He succeeded in keeping Sarracenias and various Ericaceous plants for indefinite periods, obtaining flowers and normal growth. His most satisfactory procedure was to apply "acid" by watering the bed frequently with a solution of tannin obtained from hemlock bark.

The second item was an account, illustrated by specimens of an undescribed species of persimmon, *Diospyros Mosieri* Small, from Florida.

Dr. N. L. Britton instanced the occurrence in California and Oregon of ten species of rather widespread eastern sedges, *Cyperus, Eleocharis, Rynchospora* and *Scirpus*. He emphasized their remoteness from the nearest colonies of the same species eastward.

Meeting of November 9

The meeting was held at the American Museum of Natural History.

Dr. G. Clyde Fisher gave an account of "A Naturalist's Rambles in Florida." He discussed central and northwestern Florida, and his views of the peculiar vegetation of this portion of the state were particularly appreciated. Many of these were of plants too little known, as the various large species of Sarracenia and other insect-catching plants. The vast forests of long-leaf pine, the cypress ponds and swamps, the live-oaks and pendant gray Spanish moss were well shown.

Meeting of November 24

The meeting was held at the New York Botanical Garden.

The treasurer presented an outline of the present financial status of the club. After considerable discussion this was referred to the Finance Committee for further consideration.

The following were elected members of the club: Dr. Louis J. Hodes, Mrs. A. C. Sheahan-MacKenna, A. J. Sluyter.

The scientific program consisted of two discussions.

Dr. M. A. Howe described "A Fresh-Water Red Alga from Trinidad." He exhibited and discussed specimens of a red alga collected by the New York Botanical Garden expedition to Trinidad in Maracas Waterfall at an elevation of 1,500 feet above sea level. The Trinidad plant was identified with a species first discovered in Venezuela and more fully described at about the same time, under three specific names, from mountain streams of French Guiana. The speaker alluded to another red alga, *Caloglossa Leprieuii,* found in a mountain stream in Porto Rico and also in the Hudson River at West Point.

Dr. John K. Small told of his search for the rare box huckleberry, *Gaylussacia brachycera.* He visited the three known stations for the plant, on the coastal plain of Delaware and in the Blue Ridge Mountains of Pennsylvania. He expressed the opinion that each colony was really a single plant widely spread below ground with hundreds of ascending stems, covering in one case over a hundred acres.

The Torrey Botanical Club

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Vol. 21 July–August, 1921 No. 4

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A Bi-Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

JOHN TORREY, 1796–1873.

CONTENTS

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THE TORREY BOTANICAL CLUB

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Official Organ of the Wild Flower Preservation Society of America

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7 Robbins Place
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Vol. 21 No. 4

July–August, 1921

STERILITY AND FERTILITY IN SPECIES OF HEMEROCALLIS

For a number of years problems of fertility and sterility in numerous species of plants that freely and naturally propagate by vegetative means have been under investigation by the writer. In these studies several species of *Hemerocallis* have received considerable attention, and a brief preliminary report of the results obtained with them has been given (Journal N. Y. Bot. Garden **20**: 104–105, May, 1919). Certain aspects of the research await the blooming of seedlings that are now being grown and the testing of wild plants of several species which it is hoped can be obtained from their native home in the orient. But the results already obtained, and in part published, supplement and to some degree extend the observations recorded in a recent number of the Torreya (**21**: 12–13, Jan. and Feb. 1921) and for this reason may be briefly summarized for the readers of this journal.

It is to be noted that the double-flowered form of *Hemerocallis fulva* reported in Torreya (**18**: 242) and referred to later (Torreya **21**: 13) is undoubtedly an old and well known sort. A double-flowered variety of this species is reported by Thunberg in his Flora Japonica published in 1784 and there identified as the double-flowered plant which Kaempfer (Amoen. Exot. 1712) thought was an *Iris*. At the present time two double-flowered varieties are recognized (Bailey, Cyclopaedia of Horticulture) as belonging to *H. fulva*. One of these, var. *Kwanso*, is illustrated in color in Gartenflora in 1866 (plate 500) and there said to have been introduced into Europe by von Siebold. This is evidently the double-flowered form most widely found in cultivation in Europe and America. The other variety (*flora plena*) is illustrated in color in Flora des Serres

(1869–1870) and there called *H. disticha* var. *flora plena* (*disticha* is now considered as a synonym of *fulva*). The colored plate shows this to be quite different from var. *Kwanso* in appearance. The writer has never seen this variety. A double-flowered variety has also long been known in the species *H. Dumortierii*.

A thorough search of the literature indicates that no one has ever reported fruit on the single-flowered type of *H. fulva*. This orange-colored day lily is widely distributed over Europe and America. Its complete failure to produce fruit and seeds has often been noted. Only one variety of it (var. *maculata*) appears to have been involved (probably as a pollen parent) in the production of hybrids.

In the writer's experiments with this species many intra-specific pollinations have been made between plants obtained from such widely different sources as Wisconsin, Michigan, New York, Vermont and England with complete failure in every case. The ovaries of flowers thus pollinated do not start to enlarge, and about 72 hours after the flowers open the entire flower falls leaving only spurs as shown at *a* in Fig. 4.

But the pollen of this species used in controlled crossing on *H. flava* has given pods (Fig. 2) with seeds and the hybrids resulting are now being grown. The reciprocal cross between these two species failed to yield mature pods. Pollen of *H. fulva* on *H. minor* has given seed but no germination was secured.

Pollen of *H. Thunbergii* and of *H. aurantiaca* has been used on many flowers of *H. fulva*. Usually the pods begin to form and seeds start to develop with some of them, but as a rule the pods fall when about one third mature (*b* in Fig. 4). In a few instances, however, mature pods with ripe seeds (Fig. 5) have been secured, but no germination has yet been obtained in such seeds. The reciprocals of these crosses likewise produce seed rarely. From the results of crossing *H. fulva* with *H. flava*, *H. aurantiaca* and *H. Thunbergii* it appears that its pollen and ovules are potent and are able to function in certain relations, but that the compatibility in these combinations is of a weak grade.

The literature gives conflicting reports regarding seed production in *H. flava.* Some investigators have reported plants of it to be self-fertile, others have reported the plants they have studied to be self-sterile. Both self-compatible and self-incompatible plants have been found among plants of this species grown in the New York Botanical Garden. Such conditions are often seen in a species in which self-incompatibility is present, especially if the species is propagated by seed (*Cichorium Intybus, Nicotiana Forgetiana, Eschscholtzia californica, Brassica pekinensis, Brassica chinensis,* and others). The most highly self-compatible plants produce pods in abundance, but in them are many shrivelled ovules in which fertilization may not have occurred and seeds in various stages of embryo abortion together with seeds that are fully matured and viable (Fig. 3). This condition is also specially characteristic of plants that are not fully self-compatible.

A third species, *H. Thunbergii,* has in the author's experience proved to be only feebly self-compatible. Very many carefully made self-pollinations fail (see 6, 7 and 8), but many pods do mature and these contain some seeds which will germinate. All the plants of this species which are growing in the New York Botanical Garden have behaved quite the same, but these may have all descended from a single parent through vegetative propagation. A wide range of self-compatibility may be exhibited by the seedlings which are to be tested as soon as they bloom.

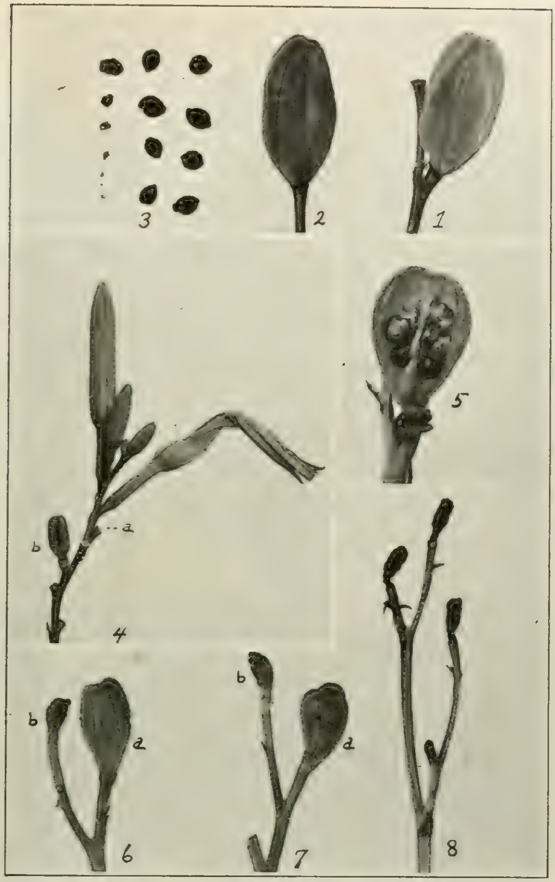
The type of sterility in these species is, undoubtedly, that of physiological incompatibility operating between the organs concerned in sexual reproduction. The readiness with which these species propagate from pieces of the roots and by rhizomes has practically eliminated the use of seeds in commercial propagation. Such a method tends to perpetuate the grade of self-compatibility of the original plant which was used. It is possible that the plants of the single-flowered type of *fulva* now growing in America and Europe may have all come by vegetative propagation from a single plant which happened to be fully self-in-

compatible. According to Clusius (*Plantarum Historia*, p. 137) this species was commonly in cultivation in middle Europe as early as 1601. Since then its cultivation has been extended over large areas of Europe and America, and in many sections it has escaped from cultivation and is spreading widely, purely by vegetative means of propagation.

It can be predicted with confidence that a search in the region where *H. fulva* is native and wild will reveal plants that are producing seed or at least strains that will prove compatible with the self-incompatible strain now found in the United States. Focke showed that such a condition as this existed in *Lilium bulbiferum*. After failing for years to get seed by selfing and crossing plants of this species obtained from various parts of Germany, he obtained wild plants from the native habitat in Tyrol and these he found compatible with strains that previously failed to produce seed.

It has very generally been held that the seed sterility of such plants as *Hemerocallis fulva, Lilium bulbiferum, Lilium tigrinum*, etc., is "correlative." That is, the vegetative organs of propagation are conceived to divert and utilize the available food so that the embryos in seeds are virtually starved to death during stages in development, or perhaps organs are so poorly nourished that they do not function previous to fertilization. But evidence is increasing to the effect that seed production in these plants is relative and depends on whether fertilizations are compatible, quite as is the case in numerous species of plants that are naturally propagated only by seeds. The experimental proof of this is sometimes difficult to obtain in the plants that are propagated vegetatively.

When self-compatible and self-incompatible plants are found and the latter prove to be highly seed-producing in certain crosses, as is the case with *Hemerocallis flava*, the evidence of incompatibilities is clear. The American strain of *Hemerocallis fulva* has sex organs that do function to some extent in certain inter-specific crosses and will, undoubtedly, produce abundant seed when it can be tested with stocks from a dif-



EXPLANATION OF PLATE

1. Pod of a plant of *H. flava;* the result of self-pollination showing that the plant is self-compatible.

2. Pod on same plant as 1; the result of controlled cross-pollination with pollen of *H. fulva.*

3. Seeds from such a pod as shown in 1 and 2; some ovules become mere rudiments of seeds and evidently are not fertilized; some embryos die during the development of seeds; some seeds develop fully and are viable.

4. Flowering branch of *H. fulva* near close of period of bloom. (*a*) Spur left when flowers fall. (*b*) Pod 10 days old, from cross with pollen of *H. Thunbergii,* but becoming wrinkled and about to fall. Occasionally such pods contain one or two partly developed seeds.

5. Mature pod of *H. fulva* from cross-pollination with *H. Thunbergii.* Such pods are rare. As far as known to the writer this is the first time the fruit of this species has been illustrated.

6, 7 and 8. All from a single plant of *H. Thunbergii.* All flowers carefully self-pollinated. Some pods (*a*) maturing and yielding a few viable seeds; some pods (*b*) becoming much shrivelled; no good pods on branch shown at 8. Results characteristic of feebly self-compatible plants of this species.

ferent seed source. But to obtain these, plants from widely different geographical sections or even wild plants from the native habitat may need to be secured.

A. B. Stout.

New York Botanical Garden.

AN ORTHOTROPOUS OVULE IN *HYACINTHUS ORIENTALIS* L.

While sectioning ovaries of the hyacinth for embryo sacs one ovary was found which shows two irregularities. One of the ovules in the upper part of the ovary is orthotropous instead of anatropous. This ovule, as figure 1 shows, is typical in all other respects, the integuments, micropyle, nucellus, and embryo

Fig. 1

sac being well formed and apparently functional. In the median portion of the ovary the carpels seem to be incompletely fused and the placentas are slightly displaced (Fig. 2). Mas-

FIG. 2

ters[1] and Worsdell[2] describe many types of modified carpels and displaced placentas in a great variety of flowering plants. These authors describe also many modifications of ovules, but I do not find that either of them records a case of an orthotropous ovule in a plant which normally bears anatropous ovules.

A. M. SHOWALTER

A STATION FOR THE RAM'S-HEAD LADY'S-SLIPPER

On May 19, 1921, Philip D. Fagans, Executive Secretary of the Woodcraft League of America, discovered near Westport-on-Lake Champlain, New York, a colony of the Ram's-head Lady's-slipper (*Cypripedium arietinum* R. Brown) in bloom and collected a specimen which he showed the next day to Oliver P. Medsger, Head of the Department of Biology in the Lincoln High School, Jersey City, N. J., and myself. Since neither of us had seen this rare orchid growing, Medsger and I lost no time in visiting the place. Although we did not make a careful census, there were doubtless fifty or more plants in the colony. They were growing rather scattered in the meso-

[1] Vegetable Teratology. London. Ray Society, 1869.

[2] Principles of Plant Teratology. Vol. II. London. Ray Society. 1916.

phytic woods, mostly on a gently sloping hillside, only a few rods from the lake beach. Medsger made a photograph of a clump. Since Dr. House states that this plant has been collected but a few times in the northern counties of the State of New York, I thought this worth reporting.

G. Clyde Fisher

American Museum of Natural History

S. M. TRACY AS A BOTANIST

The recent death of S. M. Tracy has been felt as a keen personal loss by all who have known him not only as a broad-minded, many-sided investigator but as a most genial companion and friend. His main life work was with forage plants adapted to the Southern States and with the effort for securing a greater diversification of southern agriculture.

I had been experimenting with fungicides in the treatment of pear scab when I first met Tracy. I was delighted to find that he was interested in fungi and showed him my cultures. We at once became great friends and continued to correspond regarding fungi until the time of the New Orleans Cotton Exposition which took us both South where we both remained. I lived for ten years on the Gulf coast of Mississippi while he was director of the State Experimental Station at Starkville. He bought a summer home on the north coast of Biloxi Bay not far from us where he spent his vacations collecting and studying the Gulf coast flora. It was during this period that I was most closely associated with him tho later we were companions on several extended collecting trips, notably the one to the La Plata Mountains in southwest Colorado in company with C. F. Baker and at another time a long trip through the Davis Mountain country in western Texas.

As a horticulturist and practical green house man Tracy was naturally greatly interested in plant breeding. He did much practical work in the selection and improvement of varieties. At one time he was greatly interested in the long staple upland cottons and did much to improve and stabilize

these kinds. As a botanist however his interests were frankly taxonomic. He liked plants as such and liked to study their relationships. Living as he for the most part did away from the great botanical centers with their libraries and herbaria his activities naturally took the form of field work and of collecting rather than the writing of extended monographs. He loved the open, and the collection and preparation of specimens. He was always collecting in large sets which he distributed widely and in this way probably did more than any other man of his generation to make the plants of the Southern States available for study in all of the more important American and European herbaria. His interest in forage plants led him to specialize in the grasses. He was also a student of the parasitic fungi, particularly of the rusts and the smuts, the two groups most likely to be found on grasses. His botanical papers largely deal with these two groups in both of which he discovered and described a number of new species. As with the flowering plants however his collections and field studies of the fungi were much more extensive than his publications regarding them. Excepting for his early years in Missouri botany was Tracy's recreation rather than his chief work. During the long period of his activity however there were few who contributed more than he to the real knowledge of American plants.

F. S. Earle.

REVIEWS

Martin's Botany with Agricultural Applications*

The suggestion of the technical implied by the original title of this volume (Botany for Agricultural Students) has led the publishers to issue the second edition under a new name, one that conveys somewhat more accurately the real nature of the book. While primarily designed as a text for agricultural students, the underlying principle of the book is one that is rapidly coming to the fore at the present day, viz., that, regard-

* Martin, J. N., Botany with Agricultural Applications, xii + 604 pages, 490 figures, John Wiley & Sons, New York, 1920, $3.00.

less of the class of students concerned, the chief object of botanical instruction in an elemntary course should be to teach the fundamental facts and principles of botany and to relate these to problems of practical interest.

A list of the chapter headings will suggest the nature of the topics treated: (*Introduction*) the nature and subdivisions of botany; a general view of plants; (*Part I*) flowers; pistils and stamens; seeds and fruits; germination of seeds, seedlings; cells and tissues; roots; stems; buds (including growth of stems, pruning, propagation by stems); leaves; (*Part II*) thallophytes (separate chapters on algae, myxomycetes and bacteria, fungi); bryophytes; pteridophytes; spermatophytes (two chapters); classification of angiosperms, and families of economic importance; ecological classification of plants; variation; heredity; evolution.

The present edition differs from the first in that several portions of the text have been rewritten, the chapter on variation added, and many of the illustrations replaced by new or improved ones.

George E. Nichols

Trees of Indiana

The second edition, completely rewritten, of Chas. C. Deam's Trees of Indiana * is an extraordinarily satisfactory publication. It is gratifying to consider that thousands of students, farmers, amateur botanists, and tree-lovers in general throughout that state may profit by such carefully written work from the pen of Indiana's most thorough student of the local flora.

Deam has recognized 132 species and 20 varieties of forms. Each of the former and one of the latter is illustrated by a full-page half-tone plate, photographed from a herbarium sheet. Since the sheets were chosen from Deam's own carefully prepared herbarium, the results are excellent and in most cases far better than one would naturally expect. Either fruits or flowers, or both, and frequently bark, are represented. The

* The Department of Conservation, State of Indiana, Indianapolis, 1921, 317 pages, 137 plates.

method leaves something to be desired in certain cases, where the flowers or fruit illustrate important specific differences, but it must be remembered that the book is prepared for the amateur and not the professional botanist.

The nomenclature "attempted" is that of the International Code. Synonymy is omitted. Descriptions are carefully drawn from Indiana material. The general distribution of each species is indicated and ranges within the state are discussed in such detail that the book will be an important source of information for phytogeographers. A third paragraph includes general notes, largely of a popular nature, on the abundance, uses, and local names of the plant and other miscellaneous information.

The genus *Salix* is contributed by C. R. Ball and the family *Malaceae* by W. W. Eggleston.

The whole treatment is conservative and impresses one as having been carried out with extreme care and consequently reliable results. The attitude of the author toward "splitting" is clearly shown and may be indicated here by two quotations:

"Nieuwland separates a variety from the smooth forms which he calls *Sassafras albida* variety *glauca* and reports it as occurring in the counties in the vicinity of Lake Michigan. The writer has at hand 46 specimens from 41 counties in Indiana, including all of the Lake Michigan Counties, and he has not been able to find a single character that is constant enough to make a division of our forms."

"While Sargent's key to *Tilia* quite distinctly separates the species and varieties, yet when specimens are collected from an area where the species overlap and seem to intergrade, the task of referring a specimen to the proper species or variety is not an easy one."

The same care has been used in excluding 23 reported species, each of which has been the subject of detailed investigation.

The book closes with a list of measurements of large specimens of Indiana trees, a table of specific gravities of woods, two state maps, and an index.

Typographical errors are very few, print and paper are good, half-tones are well executed, and the cloth binding is substantial. Both the author and the Department of Conservation are to be congratulated on the work.

H. A. GLEASON

PROCEEDINGS OF THE CLUB

MEETING OF FEBRUARY 25

Announcement was made of the death on January 30 of Dr. George T. Stevens, of this city. Dr. Stevens had done much to make general an interest in botany, especially through his illustrated "Guide to the Wild Flowers of the Northeastern United States." Dr. W. A. Murrill, under the title of Notes on Fungi, remarked on the recent finding of underground fungi, chiefly truffles in the United States, and on their method of collecting them. He also called attention to a curious double specimen of the cultivated mushroom, an illustrated account of which has since appeared in Mycologia **13**: 119–122.

Mr. R. S. Williams gave an account of mosses recently received from the district of Kaietur Falls, in British Guiana. Of eleven species, one, a *Macromitrium*, proved to be undescribed.

Dr. J. K. Small discussed the species of palmetto, *Sabal*, in the south giving the history of the discovery of each, and showing specimens of his own collecting.

MEETING OF MARCH 6

Dr. H. A. Gleason gave an illustrated lecture on the Big Trees of California. He showed an extensive series of views and described the vast size and something of the past history of *Sequoia gigantea*. He strongly urged the need of bringing more of these giants into park reserves.

Meeting of March 26

On Saturday afternoon the Torrey Club in cooperation with the New York Bird and Tree Club and other local organizations attended a lecture at the American Museum of Natural History by Dr. Edgar T. Wherry on Where the Wild Flowers Grow and Why. The speaker chiefly considered the nature of the soil, this forming the most variable feature of the plant's environment locally and laid stress on its chemical character.

Meeting of March 30

The scientific program consisted of three papers. Miss Cornelia L. Carey explained the structure of an agar gel. "The structure is not to be confused with an ultramicroscopic one, but is much coarser and appeared when the dried gel that had been soaked in water was viewed under the microscope. It consisted of horizontal concavities each shaped like a convex lens in section, and together giving almost the aspect of lamellations. The structure varied somewhat in gels of different strengths, gels of lower concentration showing chiefly larger slits and those of higher agar content more fine ones. When removed from the water the gels would exude under pressure a considerable amount of liquid. The slits were also visible to the eye when light was reflected from the cut surface.

"The structure is considered as due to rapidity of drying, as all gels dried at 43° C. and 70° C. showed this whether they were dried upon frames or not, whereas this was not true of gels dried at room temperatures. The formation of this structure started when the gel possessed 92–92.5 per cent. and ceased with 21.5 per cent. by weight of water. Gels varying in agar content from 0.5–10 per cent. were used."

Dr. T. E. Hazen reported on his studies in motile algae, considering the phylogeny of Brachiomonas and Lobomonas. This brought out the problem of the development of lobed structures among unicellular algae. Some of the results of this study will be presented in an early number of the Torrey Bulletin.

Miss Edna L. Smith discussed the formation of mucilage in some floral organs of certain orchids. She had studied especially the genus *Brassia* and considered that there the mucilage was a product of the cytoplasm, not as has been thought for some Cactaceae, of the cellulose of the cell wall.

Meeting of April 12

The program of the evening was an illustrated lecture by Dr. Tracy E. Hazen, entitled "Botanizing in Trinidad." Dr. Hazen was one of the party headed by Dr. Britton which visited Trinidad in the spring of 1920, his attention being given to the collection of algae and ferns. While he told of this work, he discussed chiefly the larger features of the vegetation, showing views of forests, savanna, and cultivated fields and many pictures of different species of trees and herbs. Palms, orchids, *Ficus* (with air roots), rubbber tree (*Hevea*), Bromelaids, Melastomads, Malpighiads and Cactaceae were among these.

THE TORREY BOTANICAL CLUB

Contributions to the Special Fund for Support of Publications

In response to letters telling of the financial needs of the Club, the total amount of contributions to date received from membership is $2,211.63. As more than $1,000.00 was received by May 1, 1921, we were able to secure the conditional $1,000.00 to be given if a second thousand could be raised from the membership at large, by that time. The total number of contributors is 94. The list of contributors is as follows:

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Mr. H. S. Piatt	5.00	Total	$2,211.63

Of the total pledges of $2,211.63 all but $75 has already been received. While this assistance is both timely and most deeply appreciated the committee charged with the raising of the fund for the support of publications would remind our members and the friends of the club that as prices remain high their continued financial interest is needed.

Francis W. Pennell,
Secretary-Treasurer.

The Torrey Botanical Club

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EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

JOHN TORREY, 1796–1873.

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Official Organ of the Wild Flower Preservation Society of America

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TORREYA

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THE FOREST FLORA OF GRASSY SPRAIN RIDGE

By G. T. Hastings

In walking through the woods in parts of Westchester County just above New York City the impression was gained that a new type of forest flora is developing there. To test the accuracy of this, and at the same time to see if any correlation could be made between the herbaceous vegetation and particular species of trees, a study was made of the plants on the top and upper slopes of Grassy Sprain Ridge. In the study the adaptation of the quadrat method suggested by Dr. H. A. Gleason* was followed. One meter quadrats were taken every twenty-five paces on lines along the top and slopes of the ridge. On the quadrat each species of herb and shrubs was listed and notes made of the surroundings. All the trees within two meters of the line were counted.

Grassy Sprain Ridge is one of several ridges parallel to the Hudson Valley in Westchester County. These ridges were all originally forested, have all been partially cut over and have generally gone back to forest condition. The ridge is about two and a half miles long, about a half mile broad and is cut across by a swampy area. There are several rocky knobs along both parts of the ridge and a little level land on parts of the summit. The soil is rocky, with frequent outcrops of gneissic rocks, and is nowhere deep or rich except in a few swampy hollows. A small part of the land was formerly cleared, but at present only a very small area is pastured, and none is or has recently been cultivated.

Forty-one species of trees were listed, this including several small forms—*Cornus florida*, *Carpinus*, *Ostrya*, *Hamamelis*, *Rhus*, *Sassafras*, and *Viburnum prunifolium*, two cultivated trees that have grown wild, and one that is practically extinct, *Castanea*, and

* Bulletin of the Torrey Botanical Club, 47: 21–33, Feb. 1920.

several others that will disappear as the forest develops—*Ailanthus, Robinia, Populus grandidentata, Betula populifolia* and *Juniperus.* Excluding these, the forest trees that can be expected to persist and make up the final forest number but twenty-six. Apple trees are frequent and in one place in an old meadow have grown up into a veritable orchard of scrubby trees. Cherry trees, *Prunus Cerasus,* are scattered through the woods, usually in rather open places, but a few are in close growths of oak and birch and have assumed a typical forest form, tall and straight with clear trunks for at least twenty-five feet. There are also many young cherries growing up in thickets of *Viburnum* and among the oaks. Over all the ridge there have been frequent fires that check the growth of young trees, but in spite of this there were tree shoots—oak, hickory, ash, maple and elm—on over half of the quadrats, all old enough to have survived at least one fire, and on half as many more there were seedlings of one or two years that had not been subjected to fire.

In all 1,857 trees were counted, 37 per cent. of the total being oaks. Of these *Quercus velutina* was most abundant and made 13.4 per cent. of the total, *Cornus florida*—11, *Quercus prinus*—9.7, *Q. alba*—9.5, *Acer saccharum*—6.4, *Betula lenta*—6.2, *Hicoria glabra*—6.2, *Robinia Pseudo-acacia*—5.7, and *Fraxinus Americana*—4. If the trees that are not of forest type are excluded, the oaks would form over 50 per cent. of the total. The dominant tree in most parts of the ridge is the black oak, *Quercus velutina,* though some of the drier sections were dominated by the chestnut oak, *Q. prinus.* In a few low spots with deeper soil the sugar maple, *Acer saccharum,* dominated, and in the same localities were found most of the tulip trees, basswood, beech and hemlock. Practically all of the locusts were in spots previously cut clean for pasture or cultivation. With the locusts grew all of the pin oak, swamp-white oak, walnut, staghorn sumach and apple, and half of the sassafras, elm, gray birch and sour cherry. But one tree each of *Ailanthus, Celtis, Populus grandidentata, P. tremuloides* and *Quercus stellata* was found, and but two each of walnut and hemlock. Those of which but one specimen was found were

probably accidental entrants, the hemlock and walnut relicts of former more abundant growth. The chestnuts were all dead trunks with young root shoots. Other chestnuts had been cut in recent years, as witnessed by the stumps, so that the 62 dead trees (making 3.6 per cent. of the total) is only about half the number that would have been found before the chestnut canker wrought havoc among them. The young shoots are the heroic effort of the dying trees to hold their place in the forest, but are, of course, of no importance to the future of the forest. Evidently the climax forest will differ from the one it succeeds chiefly in the loss of the chestnuts, walnut and hemlock and in the addition of sour cherry, hackberry and ailanthus. The apple trees, while holding their own with the younger growth, show no sign of being able to persist in a denser and larger forest growth. The locust, sumach, aspens and gray birch are pioneer trees that will later give way. Judging of the future composition of the forest by the young growth, ash will become relatively more important than at present, as there were more of both seedlings and shoots than of any other tree. Hickory, white and black oak, black birch and sugar maple all have frequent shoots and less frequent seedlings, and even with the frequent ground fires will be at least as important in the future as at present. If fires could be prevented dense forest would soon develop. Tulip trees seem to be more sensitive to fire than others, for while seedlings of one season were common older ones or root shoots were entirely absent.

No definite correlation could be made between the shrubby and herbaceous vegetation and the trees. Chestnut oaks, which dominated certain parts of the ridge, had associated with them laurel, azalea and Vacciniums, none of which grew with the black oaks. Under the same trees, too, *Helianthus divaricatus* and *Anychia canadensis* had their greatest frequency indices. Black oak, the most abundant tree, and for large areas the dominant one, had no plants especially associated with it, though the most abundant plant of the region, *Falcata comosa,* had its highest frequency index under these trees, as did also *Poa compressa* and *Potentilla canadensis.* With sugar maple in the damper soil grew all the

Asarum, Bromus ciliatus and *Impatiens,* and the largest proportion of *Anemonella, Antennaria, Arisaema, Aster divaricatus, Polystichum* and *Adiantum.* With the locust trees grew plants characteristic of the open rather than of the woods; in fact, no forest plants at all were found except one plant of *Aquilegia* and one of *Botrychium virginianum.*

It is evident that the climax forest that will develop if allowed to will differ but slightly from the original forest of the region. This difference will be due to the loss of a few species, especially chestnut and hemlock, and the possible addition of a few new species, such as sour cherry and ailanthus, which will never make a large proportion of the trees. There will also be a greater proportion of black oak and white ash. The vegetation below the trees will show more change, as some introduced plants characteristic of open places are so well established in parts of the forest with shallow soil and somewhat xerophytic conditions that they may be considered a permanent part of the forest. Among such plants are *Potentilla canadensis, Poa compressa, Oxalis stricta, Fragaria virginiana, Ambrosia artemisaefolia* and *Rubus occidentalis.*

SOME INTRODUCED PLANTS OF UTAH

By A. O. Garrett

The following paper is supplementary to one entitled "Some Introduced Plants of Salt Lake County," published in the October, 1919, number of Torreya. In that paper sixty-eight species were enumerated as occurring in Salt Lake County. These, together with those here listed, brings the State catalog up to a total of 102 species.

69. *Asparagus officinalis* L. Garden Asparagus. A common escape along streams and irrigation ditches throughout the State.

70. *Rumex Patientia* L. Patience Dock. In Salt Lake and adjacent counties.

71. *Polygonum Convolvulus* L. Black Bindweed. Throughout the State.

72. *Chenopodium Botrys* L. Along the streams of canyons, Salt Lake County.

73. *Chenopodium Bonus-Henricus* L. In Ogden Canyon, Weber Co.

74. *Chenopodium murale* L. In Salt Lake County.

75. *Atriplex rosea* L. Tumbling Atriplex. One of the commonest weeds of waste places in the State, especially where the soil is more or less alkaline. Dr. Nelson described the western weed as a distinct species under the name of *Atriplex spatiosa.*

76. *Amaranthus graecizans* L. Tumbling Amaranth. Common in waste places throughout the State.

77. *Chelidonium majus* L. Sparingly escaping in Salt Lake City.

78. *Thlaspi arvense* L. Field Penny Cress or Mithridate Mustard. Reported from Logan, Cache Co.

79. *Camelina microcarpa* Andrz. Small-fruited False Flax. Throughout the State.

80. *Isatis tinctoria* L. Dyer's Woad. Well established and common in various parts of Box-elder County.

81. *Malcomia africana* (Willd.) R. Br. A common weed around Manti, Nephi, Axtell, etc. In the vicinity of the reservoir south of Juab there are many acres already covered almost solidly with it. Naturally a weed of alkaline soils, it is likely to become one of the troublesome weeds of the State within a very short time.

82. *Galega officinalis* L. Goat's Rue. Collected at Logan, Utah, August 19, 1920, and sent to Dr. Rydberg, who determined it. The specimen is now at the New York Botanical Garden. The specimen collected was certainly an escape. How well it is established, however, I do not know.

83. *Medicago lupulina* L. Nonesuch. Well established in lawns and other grassy places throughout the State.

84. *Medicago officinalis* L. Alfalfa: Lucerne. Escaping from cultivation throughout the State.

85. *Onobrychis Onobrychis* (L.) Rydb. (*O. sativa* Lam.). Sandfoin. Escaping and well established in Rock Creek Canyon, near Provo, Utah Co.

86. *Tribulus terrestris* L. Bur-nut. Well established in Salt Lake City along railroad tracks, where it has probably come from California. The weed is giving a great deal of trouble to automobile tires in California, where the expressive name of "Puncture Vine" is given to it.

87. *Hibiscus Trionum* L. Bladder Ketmia. This plant was observed by me to be well established in cultivated fields at North Ogden, Weber County, and at Provo, Utah County, during the summer of 1919. Last summer I noticed it in cultivated fields at Ogden. None of the Floras give this plant for Utah.

88. *Daucus Carota* L. Carrot; Queen Anne's Lace. Along irrigation ditches in Salt Lake County. Well established.

89. *Cuscuta planiflora* Tenore. Alfalfa Dodder. Common and destructive in alfalfa fields throughout the State.

90. *Anchusa officinalis* L. (*A. arvalis* L.). Alkanet. Escaping and well established in Rock Creek Canyon, near Provo, Utah County.

91. *Cynoglossum officinale* L. Common Hound's Tongue. This weed, detested especially by sheep men, is thoroughly established in Logan Canyon and along the railroad tracks in several places north and south of Logan, especially at Mendon. It is also equally well established at Nephi, Juab County.

92. *Solanum villosum* Mill. Vigorous plants of this weed were observed in cultivated gardens near Lewiston, Cache Co., August 20, 1920. A specimen was sent to Dr. Rydberg for determination.

93. *Hyoscyamus niger* L. This plant has been reported from Kaysville, Davis Co., as well established.

94. *Verbascum virgatum* With. Moth Mullein. Growing abundantly near Ensign Peak, above Salt Lake City.

95. *Veronica Tournefortii* C. C. Gmel. (*V. Buxbaumii* Tenore.) Thoroughly established in Salt Lake and Wasatch Counties.

96. *Veronica hederaefolia* L. Ivy-leaved Speedwell. Reported from Logan, Cache Co.

97. *Dipsacus sylvestris* Huds. Teasel. Thoroughly established on the sides of the ponds along the railroad tracks, etc., from Bountiful, Davis Co., north to Logan, Cache Co., and beyond.

98. *Maruta Cotula* (L.) DC. (*Anthemis Cotula* L.) Dog Fennel; Mayweed. Well established and increasing in Utah, Salt Lake and Beaver Counties, and probably in other parts of the State where it has been introduced.

99. *Sonchus arvensis* L. Field Sow Thistle. An abundant weed along the streets in the southern part of Salt Lake City.

100. *Tragopogon dubius* Scop. Yellow-flowered Salsify. Becoming fairly common at Salt Lake City, but abundant in Cache Co.

101. *Inula Helenium* L. Elecampane. Sparingly escaping, but well established, at Provo, Utah Co., and Orangeville, Carbon Co.

102. *Onopordon Acanthium* L. Cotton Thistle; Scotch Thistle. Permanently established near Grantsville, Tooele Co., and at Salt Lake City.

East High School,
Salt Lake City, Utah.

SHORTER NOTES

The J. Roberts Lowrie Herbarium.*—During August, 1920, the officials of The Pennsylvania State College received a letter from Mr. Roberts Lowrie, of Philadelphia, stating that it was the desire of the family to present the herbarium, prepared by his father, Mr. J. Roberts Lowrie, formerly of Warriorsmark, Pa., to the College. Acting on the suggestion contained in the letter, the writer, accompanied by Professor C. R. Orton, made a visit to the Lowrie residence in Warriorsmark to accept the herbarium on behalf of the College and to learn more of the botanical activities of its maker. On this and a subsequent visit to Warriorsmark, a village at the base of the Bald Eagle Ridge about twenty-five miles southwest of State College, we were most cordially received at the beautiful old homestead by Miss Sarah R. Lowrie,

* A note presented to the Botany Seminar, The Pennsylvania State College, March 16, 1921.

daughter of Mr. J. Roberts Lowrie. From Miss Lowrie and from an account in the Botanical Gazette,* written by Dr. Thos. C. Porter, shortly after the death of Mr. Lowrie, we gained the following interesting information regarding the life of Mr. Lowrie.

In 1854 Mr. Lowrie took up his residence at Warriorsmark, having taken the position as legal adviser and general manager for what was at the time the largest iron manufacturing firm in the United States. This firm "owned one of the largest estates in central Pennsylvania, including farms, furnaces, ore-banks, and many thousand acres of mountain lands covered with forests." Mr. Lowrie was strongly inclined to the study of the natural sciences, particularly botany, and, as Dr. Porter points out, this situation gave him a fine opportunity for such studies. That Mr. Lowrie took advantage of this opportunity to study the native flora is evidenced by the fine herbarium he left which is rich in the rare and interesting plants of central Pennsylvania. The fact that specimens were taken in some of the regions which are now favorite collecting grounds for the botanists of the College adds further interest to this collection. During the sixty-six years since the founding of the Pennsylvania State College, Bear Meadows, an elevated mountain-bog, has been a famous place for botanical explorations. Mr. Lowrie collected there before the college was founded. *Listera convallarioides* Hook., said by Porter to be known in no other station south of northern New York, was collected in Bear Meadows by Mr. Lowrie in 1853. *Prunus Alleghaniensis,* described by Porter, a restricted species of central Pennsylvania, was brought to light by the efforts of Mr. Lowrie. *Aster Lowrieanus,*† dedicated to Mr. Lowrie by Dr. Porter, is an evidence of high esteem for contributions "to our knowledge of the flora of central Pennsylvania."

Not only did Mr. Lowrie build up his herbarium with collections from his own region, but through his acquaintance with other botanists he arranged for exchanges so that many other

* Bot. Gaz. **11**: 64. 1886.

† Bull. Torrey Club **21**: 121. 1894.

parts of the United States are represented by specimens. The very numerous specimens collected by Dr. Porter are of particular interest, since the Porter herbarium, originally at Lafayette College, Easton, Pa., has been so severely damaged by fire.

The specimens are mounted on standard size sheets and are in good repair. In going over the collection it was found that there are 2,750 specimens. These represent 144 families and 707 genera. In addition to the mounted and classified specimens, there are a large number, perhaps a third as many more, unmounted and not incorporated into the collection. These came into our hands in the condition in which they lay on the owner's work table at the time of his death.

It may not be out of place to mention here that Mr. Lowrie's love of plants was further evidenced by the unusually attractive and extensive manner in which he converted the grounds about his house into an arboretum. These beautiful grounds filled with rare and interesting shrubs and trees, both native and exotic, occupy a space of nearly twenty acres. During the thirty-five years since the death of Mr. Lowrie this veritable park has not had the care and attention that it would have received from its originator, but even after this long lapse it is still a most remarkable place, both for its beauty and scientific interest. The wonderful afternoon which we spent there last August will not soon be forgotten, and it is our hope that this living monument may be long preserved to flourish in memory of its maker.

FRANK D. KERN.

CYNOSURUS ECHINATUS IN OREGON.—In the February, 1920, issue of the American Botanist (Vol. 26, No. I) attention was called to the collection of *Cynosurus echinatus* at Eugene, Oregon. It was also recorded in TORREYA (Vol. 19, No. 10, p. 189). Since this species is still very rare in the United States, it might prove of interest to state in detail the conditions of its growth and occurrence. My first specimens were obtained in June, 1919, on Skinner's Butte, which is a very good station for the study of grasses; it is directly north of Eugene—between the city and the Willa-

mette River. The soil here is dry both winter and summer on the open south side. On the north side, however, is a heavy wooded area. Among the typical grass flora found on these rocky south slopes the most common species are: *Aspris caryophyllea* (L.) Nash; *Poa pratensis* L.; *Poa annua* L.; *Poa compressa* L.; *Poa scabrella* (Thurb.) Benth.; *Festuca idahoensis* Elmer; *Festuca megalura* Nutt.; *Gastridium ventricosum* (Gouan) Schinz and Thell.; *Elymus Caputmedusae* L.; *Elymus glaucus* Buckl.; *Sitanion jubatum* Smith; *Agropyron tenerum* Vasey; *Stipa Lemmoni* Scribn.; *Bromus marginatus* Nees; *Bromus hordeaceus* L.; *Bromus villosus* Forsk.; and *Agrostis Hallii* Vasey.

The plants of *Cynosurus echinatus* were on the southwest lower slope of the butte, overlooking the railroad. There were a large number of fine specimens along a dry ditch and a road which leads to the summit. They were growing thickly together, but only in this one restricted location. Last summer the number had increased, and the dead stalks of the year before could still be easily recognized.

I was greatly surprised in June, 1919, to find a few specimens also on the lower west side of Spencer's Butte, along a narrow trail, in a cleared space overgrown with grass and surrounded on all sides by dense woods. This butte is 2,063 feet high and is about six miles south of Eugene. On both buttes this grass was found in rather dry, rocky soil. Prof. J. K. Henry has included this species in his Flora of Southern British Columbia on page 37, and writes me in regard to it: "*Cynosurus echinatus* is a not uncommon introduced grass on dry hillsides or even occasionally in gardens near Victoria." He first collected it there about five years ago.

In appearance *C. echinatus* is not very similar to *C. cristatus*, which is sometimes found on parkings in Eugene. The spikelets are somewhat alike in the two species, but the awns of *C. echinatus* are long and produce a prickly or burry effect which is not present in *C. cristatus*. In the former the panicles are long and slender, while in the latter they are compact and hardly over 3 cm. long. Both species are slender and rather inconspicuous. *C. echinatus*

could not be mistaken for any of our native grasses. The only grass that grows here that even suggests it is a small dry and stunted *Dactylis glomerata*—and this an introduced species.

In order to give an idea of the occurrence of *Cynosurus echinatus* in the United States, the following list of herbarium material will indicate its scarcity:

*1. Gray Herbarium. No specimens from the United States.

*2. New York Botanical Garden, also none from the United States.

*3. U. S. National Herbarium.

California: Marin Co., 1912, *Eastwood.*

Oregon: Eugene, *Bradshaw.*

Of the four species now retained in the genus *Cynosurus* L., only two are found introduced in the United States; all are of the Mediterranean region. *C. cristatus* L. is sometimes cultivated in this country, but is of practically no economic importance. The other seven Linnean species are now referred to other genera. Hackel says in Engler and Prantl (Nat. Pflanzenf. II. 2, 73): "*C. echinatus* L. in Südeuropa, Ackerunkraut." *C. echinatus* belongs to the section *Phalona* (which Adanson made a genus), while *C. cristatus* is included in the section *Eucynosurus.* There is a good figure of *C. echinatus* in Engler and Prantl. Besides the material from the United States, the following regions are represented by collections in the U. S. National Herbarium: South America; Africa; New Zealand; Italy; France; Syria; England; Switzerland; Spain–Portugal; Austro-Hungary–Balkans; and the Canary Islands. Macoun collected it as far back as 1908 in Nanaimo, Vancouver Island.

For assistance in the preparation of data I am deeply grateful to: Mrs. Agnes Chase; Dr. J. H. Barnhart; Dr. J. K. Small; Miss Mary A. Day; Prof. J. C. Nelson; and Prof. J. K. Henry.

R. V. Bradshaw.

Eugene, Oregon.

The Boy Scouts and Conservation of Wild Flowers.—One of the subjects recently offered to scouts for merit badges is

* Duplicates of my collections are to be deposited in these herbaria.

botany. To secure this badge a scout must collect, mount and label fifty specimens of flowering plants, *without the roots.* In addition, five each of ferns, mosses, liverworts, lichens, fungi and algae must be prepared and, if possible, labeled. One of the other requirements is an essay of at least two hundred words on the conservation of wild flowers. Both the scout handbook and the merit badge pamphlet on botany emphasize the necessity of protecting plants and caution scouts not to gather rare flowers. Parts of two essays recently submitted to the editor by applicants for the Botany Merit Badge are given here as showing the understanding scouts have of the importance of wild flower conservation.

"Leave the flowers alone. Let them grow. By doing this you can help to increase the beauty of the country. Among the flowers that are being exterminated are the Jack-in-the-Pulpit, Spring Beauty, Mountain Laurel, Flowering Dogwood and Wild Pink. It will be noticed that all of these are now seldom seen near the cities and some of them seldom in the woodlands. A good rule to follow is 'Never collect one flower unless there are three seen, nor collect two unless six are seen, and never collect a root unless there are more than ten plants in the colony.'

"One of the most important works of Botanists should be the conservation of wild flowers. This is especially important in the parks and other places about cities. If people are allowed to gather as many flowers as they wish some of the rarer flowers will soon be extinct in the unprotected places. Among those flowers which are in danger of extinction is the Pink Lady's Slipper. This flower may be found in deep woods along with the mountain laurel. It is very attractive and likely to attract the attention of any passer by. The Mountain Laurel also is in danger of being wiped out, for it is gathered in great bunches by people who picnic in the mountain woods. Although it is abundant now it is being rapidly diminished."

THE EDITOR.

REVIEWS

Reinheimer's Symbiosis*

The author's thesis with regard to evolution is that everything normal and sound in organic evolution is due to biologically righteous (*i.e.*, essentially coöperative) behavior, whilst everything abnormal and pathological is due to unrighteous (*i.e.*, fundamentally predatory) behavior. This is not the place to discuss the main thesis of the book, which is not offered as a contribution to botanical literature, but this is the place to note that the book contains numerous statements about plants that are inaccurate or incorrect, and sure to mislead readers not familiar with botany. Thus on page 41 the author refers to a statement by W. C. Worsdell that "the root of the vascular plant is less prone than any other organ to deviate from the normal form," and then adds: "When we bear in mind that . . . the premier industry of the plant . . . consists in the conversion of inorganic into organic material, it seems doubly remarkable that those parts which are most busily engaged upon such industry, though ever so unobstrusively and even shut away from sunlight, are the most robust in health," etc. On page 57 the author says: "I have contended these *ten years* that there is a biological causation of disease. . . ." The italics are the reviewer's. No biologist needs to be reminded that a biological causation of disease was experimentally demonstrated by Pasteur some forty-odd years ago. On the same page we read: "Few would have imagined that the case of hay fever provides an illustration of the biological causation of disease." The very name "hay" fever indicates that such a relationship has been commonly recognized for years.

On page 58 the action of pollen in causing pollinosis is explained on the ground that its "protoplasm is so poor in food values," though it is now common knowledge that so-called "hay fever" may be caused by a great variety of proteins, such as beans, beef, cheese, fowl, fish, whole wheat and others, standing at the top of the list in food value. On the same page pollen

* Reinheimer, H. Symbiosis: A socio-physiological study of Evolution. Pp. xii + 295. Headley Brothers, London, 1920.

grains are referred to as seeds. On page 59 we read that "the large majority of the plants whose pollen give rise to hay fever are worthless weeds," yet the list of well-known offenders in this respect includes such economically important plants as cherry, clover, corn, timothy, rose, and others, and numerous trees of great importance for timber.

Chapter V, *The "intelligence" of plants,* is mainly a commentary on Maeterlinck's essay, *L'intelligence des fleurs,* which the author apparently accepts, *litteratim.* He quotes Maeterlinck's citation of the seeds of the mistletoe, juniper and mountain-ash, "which provide for their dissemination by birds and which, to entice them . . . lurk inside a sweet husk." Maeterlinck interprets this as evidence on the part of the plant, of "a powerful reasoning faculty . . . a remarkable understanding of final causes." Reinheimer (p. 87) challenges anyone "to produce a better and more rational interpretation of these phenomena"; and adds that, "the assumption is by no means fanciful that the plant is also a direct sustainer of animal intelligence. The animal takes in 'knowledge' with its food . . . 'knowledge' which is 'predigested' by the plant." In this connection, it would be malicious to note that, toward the end of the same paragraph, the author quotes Prof. John Dewey as saying that, "it is not we who think in any actively responsible sense; thinking is rather something that happens in us."

C. Stuart Gager.

Clements's Rocky Mountain Flowers*

A lady, intensely struck with the wealth of form and coloring of the Texas wild flowers, once wrote me inquiring for a book describing and illustrating this flora in such a way that she could with her all but forgotten elementary botany "spot" their names and learn more about them. I wrote her, regretting the lack of

* Clements, Frederic Edward and Edith Schwartz Clements. Rocky Mountain Flowers. An illustrated Guide for Plant-Lovers and Plant-Users. Field ed. Pp. xxxi + 392. Illustrated. The H. W. Wilson Co., New York. 1920. Price $4.50.

such a book for that section. No doubt many tourists, ranchmen and others in the Rocky Mountain region and adjacent plains have wished also for just such a book. In "Rocky Mountain Flowers," Professor Clements and his wife have, I believe, produced such a volume. There are details that might be criticized, but in a section where the wild flowers are so striking and varied in color and form, and so plentiful that they are often a dominant note in the coloring of the landscape, such a book is much to be desired, and criticisms as to slight defects in the accuracy of the color plates and in the use of such unfamiliar Latin names as Brassicaceae for Cruciferae are out of order. The reviewer, who has collected plants both as an amateur and a professional in this region, finds this volume a distinct innovation for that part of the country. The book has easily worked keys, with family and genus descriptions, and covers the wild flowers of the West from the Canadian Rockies to California and New Mexico, and as far east as the western halves of the plains states of Kansas, the Dakotas and Nebraska. Both keys and descriptions are simple enough for the beginners in high schools and colleges, for general botanists with slight taxonomic training, for tourists, and for the general lover of nature who desires to know plants and talk about them, but who has not had the opportunity, time or inclination to wade through a great mass of technical detail in order to gain the very general knowledge he desires. In this volume the general, rather than specific, aspects are emphasized, making it especially valuable for the forester and ecologist who of necessity must do much of their identification work in the field, and who must, therefore, have descriptions not difficult to apply. There are 25 full-page color plates illustrating 175 floral types in such a way that the most untrained layman would recognize them. Added to these are 355 black and white illustrations of floral "types." There is a key flower chart which should be of great help in plant identification, especially to those other than professional systematists. The book is convenient in size, very attractively bound in dark red limp leather, and contains a glossary of scientific terms.

ORLAND E. WHITE.

Clements's Flowers of Mountain and Plain*

In part this book is an abridged edition of "Rocky Mountain Flowers," in the sense that it contains the same 25 color plates illustrating one hundred and seventy-five of the most striking western mountain and plains wild flowers. There are no keys nor technical descriptions, for the volume is intended primarily for travelers and flower lovers who wish a souvenir of their trip in this region, and who desire a means of easily recognizing flowers met on tramping excursions, or seen from car windows or an automobile. Each plant illustrated is accompanied by text giving both its common and scientific names, something about the kind of place it grows in, its time of bloom, and often other facts concerning its life history which would be of general interest. For example, in many cases the edible parts of the plant are noted, while in other cases facts regarding insect pollination, stock poisoning or some ancient superstition are set down. In the reviewer's opinion, this is just the sort of book to give your unbotanical friend living in that region or who is going there on a vacation. It is compact, nicely bound and authoritative.

Orland E. White.

Harshberger's Pastoral and Agricultural Botany†

Although issued as a textbook of agricultural botany for colleges and possibly secondary schools, this volume, from its contents, is evidently intended primarily for a very limited group of students, such as those interested in veterinary science or in range problems. The reviewer can not think of any agricultural college in which this volume could be profitably used as a regular course text. Approximately one third of the book, or nine of the eighteen chapters, is devoted to stock-poisoning plants, their distribution, their effect on stock and human beings, and the remedial measures. The remaining nine chapters consist of one on feeds and feeding, three on grasses with emphasis on their economic

* Clements, Edith S. Flowers of Mountain and Plain. 2d ed., enlarged. Pp. 79. Illustrated. The H. W. Wilson Co., New York. 1920. Price $2.75.

† Harshberger, John W. Pastoral and Agricultural Botany. Pp. xiii + 294. Illustrated. P. Blakiston's Son & Co. Philadelphia. 1920. Price $2.00.

phases, such as their importance as cereals and forage plants; two chapters emphasizing in some detail the economic value of the legume or pea family, and one chapter on the value of certain bacteria in accumulating nitrogen. This chapter (XVI) mentions the value of green manures and the failure of the preparation "nitragen" in disseminating the nitrogen bacteria. It also contains a long list of nitrogen-consuming plants, very tersely described and classified as to part of plant economically valuable. The final two chapters are devoted to weeds and weed control and agricultural seeds, seed selection and seed-testing. The author evidently considers plant breeding and genetics, plant physiology and plant diseases as subjects of too specialized a nature to include in an elementary agricultural text. So far as the reviewer can determine, they are not considered. Extensive bibliographies on each subject are given, most of the material being very accessible. Many interesting problems are touched upon. On page 219 the fertilizer waste due to the common method of sewage disposal from large cities is discussed, while on page 83 a method of desensitizing human beings against poison ivy is described. The treatment takes one month and gives immunity for one month. On pages 90–91 is a detailed account of Socrates' death by poison hemlock, taken from Plato. On page 62 the planting of garden larkspur in masses about gardens is advised by Froggat because of its poisonous nature, as a protection against locusts and grasshoppers. Other species are cited as deadly to maggots and ticks. This treatment, in the reviewer's opinion, would probably prove about as efficacious as the proverbial Frenchman's flea-powder, or the use of castor bean plants as protection against mosquitoes. On pages 15 and 82 blondes (blue eyes) are said to be very susceptible to poison ivy, while brunettes (dark, swarthy skins) are practically immune. This statement does not accord with the reviewer's experience. Among eleven blondes questioned, six, including the reviewer, were practically immune, while five were susceptible. Of six brunettes, five were susceptible and one was practically immune. On page 101 nightshade berries (*Solanum nigrum*) are mentioned as poisonous. On page 131, Pt. II, Pam-

mel's Manual of Poisonous Plants, green berries of this plant are stated to be poisonous to man, but the ripe berries have been eaten by Pammel and others with no ill effects. In South Dakota the reviewer has often seen them eaten with no ill effects. In fact, they are gathered and, after cooking, used for delicious pie filling. On page 80 two questionable statements occur regarding the castor bean, viz., " Flowers are borne in separate clusters as pistillate and staminate," " Poultry have been poisoned by eating the seeds." As well known, castor bean flowers are borne on different parts of the same flower spike. Poultry are stated to be especially immune to castor bean poisoning. (Nat'l Dispens., 2d ed., p. 1146; Pammel's Poisonous Plants, Pt. II, p. 594.) One hardly refers to the horsetail (*Equisetum*) as " this fern plant " (p. 39) in modern botanies. On page 74 loco-weed, *Aragallus lamberti,* is referred to as white-flowered in large areas in Colorado, Wyoming and Montana, while such authorities as Rydberg, Coulter and Nelson, Britton, and Gray describe the flowers of this species as purplish or violet, " rarely white " or " seldom yellowish." Rydberg and Chesnut apparently regard the white-flowered loco-weed as *Aragallus spicatus* (Hook.) Rdbg. The book is attractively bound in limp cloth and the illustrations are good.

Orland E. White.

The Torrey Botanical Club

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(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

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New York Botanical Garden

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Vol. 21 November–December, 1921 No. 6

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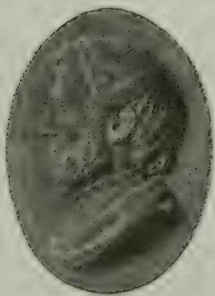
EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS



JOHN TORREY, 1796–1873.

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TORREYA

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November–December, 1921

CAPE COD VEGETATION

Roland M. Harper

Cape Cod, which is approximately coextensive with Barnstable County, Massachusetts, being practically the northernmost extension of the Atlantic coastal plain of North America, and easily accessible from several large centers of population and scientific activity, has attracted the attention of many botanists, past and present. There are innumerable references to Cape Cod plants in taxonomic and floristic works, but, strange to say, comparatively few papers relating primarily to the flora of the Cape, and still fewer that contain illustrations of the vegetation as such or give any idea of the relative abundance of the species.

The earliest work that deserves to be cited in this connection perhaps is Thoreau's book, "Cape Cod," first published in 1865 (after the author's death), and reprinted in various editions. It gives a very general idea of the aspects of nature, but devotes more space to people than to plants, although the author was well acquainted with the New England flora.

The only paper on the land plants of Barnstable County cited in Miss M. A. Day's list of New England local floras* is a short one by Walter Deane, entitled "A Few Cape Cod Plants" (Bot. Gaz. **14**: 45–47. 1889). This relates to the vicinity of Hyannisport, on the south side of the Cape. In the next few years after the publication of Miss Day's list several important papers on Cape Cod vegetation (as distinguished from mere flora†) appeared.

Dr. Arthur Hollick, in his "Geological and botanical notes: Cape Cod and Chappaquiddick Island, Mass." (Bull. N. Y. Bot.

* Rhodora **1**: 158. 1899.

† For a discussion of the difference between vegetation and flora see Torreya **17**: 1–3. 1917.

Garden **2**: 381–407. April, 1902), gives a good account of the dune vegetation around Provincetown, at the tip of the Cape (pp. 389–397). Later in the same year Charles H. Shaw published a successional study of a different type of vegetation at the opposite extremity of the county, with several illustrations, entitled "The development of vegetation in the morainal depressions of the vicinity of Woods Hole" (Bot. Gaz. **33**: 437–450, *figs. 1–6*. June, 1902). A criticism of this a few years later by H. H. Bartlett (Rhodora **11**: 221–235. 1909) gives some additional details about the bog and marsh vegetation of that neighborhood.

Of quite different character is a valuable contribution by J. W. Blankinship on "The plant formations of eastern Massachusetts" (Rhodora **5**: 124–137. 1903). But in that Cape Cod is only a part of the area treated, and no geographical boundaries are drawn, so that a distant reader has no way of knowing just which of the plants listed grow on the Cape and which do not.

A well-known government bulletin by J. M. Westgate, "Reclamation of Cape Cod sand dunes" (U. S. Bur. Plant Industry Bull. 65, with 38 pages and 6 plates. 1904), contains a brief description of the vegetation around Provincetown, with notes on the changes it has undergone since the country was first settled. The next year appeared a somewhat similar study of a small area on the other side of the Cape, and likewise mentioning only a few species, namely, "Reforestation at Woods Hole, Massachusetts,—A study in succession," by M. A. Chrysler (Rhodora **7**: 121–129. *pl. 62, 63*. 1905).

The papers on Cape Cod plants in the next ten years were almost wholly floristic. In Rhodora for July, 1909, January, 1910, and February, 1911, are three interesting articles by F. S. Collins, written in narrative style, and mostly pertaining to the flora of Eastham, on the "lower Cape" (*i.e.*, that part north of the "elbow"). A year after the last one, E. W. Sinnott published a floristic and phytogeographical paper on "The pond flora of Cape Cod" (Rhodora **14**: 25–34. Feb., 1912).

This seems to bring us down to the present time, omitting a few geological and geographical works, papers on algae, descriptions of

new species, and notes on selected species found on the Cape. None of the papers cited describe the vegetation of the Cape, except in very general or indefinite terms or for very small areas, or attempt to indicate what proportion of the total is made up by any one species. For example, it is difficult to ascertain from existing literature whether the commonest tree, *Pinus rigida*, occurs only as scattered individuals or in large forests like the pine-barrens of Long Island and New Jersey.

Before discussing the plants of the Cape it will be well to sketch their environment briefly. Cape Cod is a low but not flat peninsula, underlaid at least in part by Pleistocene strata and covered with glacial boulders, gravel, dune sand, marsh muck, etc., with a somewhat "oceanic" climate on account of being nearly surrounded by the Atlantic Ocean. It is remarkably similar to Long Island in soil, topography, vegetation, and various other features, a fact which seems to be seldom mentioned, perhaps because very few geographers have explored both areas. If one wished to go into such details, it could be divided into about five subdivisions or minor regions.* Near the mainland, on the so-called "upper Cape," hills, granite boulders, deciduous forests, orchards, and pastures are common, and the country does not look very different from some places far in the interior of Massachusetts; but toward the extremity it becomes more and more sandy and devoid of rocks, trees, and farms, and the last several miles near Provincetown are all dune formation.

Thoreau and other writers of his time describe the Cape as nearly destitute of trees, but there is considerable forest now, for two or three reasons. First, there are now railroads to bring coal from Pennsylvania, so that the inhabitants do not have to depend on wood to keep them from freezing in winter. Second, the rural population and the amount of farm land has diminished, as nearly everywhere in New England and near-by states, allowing forests to take possession of many abandoned fields.† Third, the process

* For a geographical sketch of the Cape, with bibliography, see A. P. Brigham, Geog. Review 10: 1–22. "July" [Sept.], 1920.

† See Journal of Forestry (Washington) 18: 442–452. (May) 1918.

of reforestation has been expedited in a few places by artificial planting of both native and exotic trees.

My first visit to Cape Cod was made in October, 1920, under very favorable circumstances. My life-long friend Clarence H. Knowlton, of Hingham, Mass., an amateur botanist and a frequent contributor to Rhodora, was about to make a business trip in his automobile the whole length of the Cape, and invited me to accompany him. In three days, the 13th, 14th and 15th, we passed through every one of the fifteen towns in Barnstable County, and as the roads were practically all of smooth asphalt, and our speed seldom exceeded 25 miles an hour, I was able to make legible notes practically every mile of the way. Although I had to keep my eyes on my notebook about half the time, and thus might have missed many interesting plants, Mr. Knowlton, who was already familiar with the ground, often called my attention to them. When he stopped in the towns, sometimes for an hour or more, I usually walked ahead and examined the vegetation near the road until overtaken; and at the more interesting places we both got out to reconnoiter.

In this way I secured a reasonably accurate census of the existing vegetation of the whole county, aside from the rarer species, those not recognizable in October, those chiefly confined to beaches and marshes, and the bryophytes and thallophytes (which, however, like the rare species, make up a very insignificant proportion of the total bulk of vegetation). But my notes are of course not complete enough yet for any one of the five or more geographical subdivisions (still less so for different habitats) to warrant treating them separately here; so that the following list is to be regarded as an average analysis of the native and naturalized plant covering of the whole Cape.

It is divided into trees, woody vines, shrubs, undershrubs, and herbs, and the species in each group arranged in approximate order of abundance, beginning with the most abundant (as has been my wont for about 15 years past), and omitting those seen only once. The names of evergreens are in heavy type, and of species believed not to be indigenous in parentheses. The normal mode of dissemi-

nation, where known, is indicated by more or less suggestive letters after the names, as follows: O, berries or other fleshy fruits; Q, acorns or other nuts; T, "tonoboles," a term coined by Clements to indicate plants with small dry seeds in erect capsules or receptacles borne on stiff stems which may be set in motion by the wind or passing animals; X, barbed fruits; and Y, wind-distributed fruits or seeds. (To get the proper sequence read the left-hand columns first.)

Trees

Pinus rigida Y
Quercus coccinea Q
Quercus alba Q
Acer rubrum Y
Quercus velutina Q
(*Robinia Pseudo-Acacia*) Y
Juniperus Virginiana O
Chamaecyparis thyoides
Betula populifolia Y
Nyssa sylvatica O
(*Prunus serotina*) O
Quercus stellata Q
Pinus Strobus Y
(*Populus alba*) Y
(*Sassafras variifolium*) O
(*Prunus Virginiana*) O

Woody Vines

Smilax rotundifolia O
Rubus hispidus O
Vitis Labrusca? O
Rhus radicans O

Shrubs

Gaylussacia baccata O
Quercus ilicifolia Q
*Comptonia peregrina**
Myrica Carolinensis
Prunus maritima O.
Clethra alnifolia T
Rhus copallina O
Rhus typhina O
Viburnum dentatum O
Spiraea latifolia T
Rhus Vernix O
Vaccinium corymbosum O
Ilex glabra O
Viburnum cassinoides O
Rosa sp. O
Spiraea tomentosa T

* This appears to be absent from the dune area around Provincetown.

Undershrubs

Arctostaphylos Uva-ursi O	Hudsonia ericoides
Hudsonia tomentosa	Corema Conradii*

Natural opening full of *Hudsonia tomentosa* and *Cladonia* sp. (both small slow-growing plants) in small barren sandy hollow in northern part of Yarmouth. Trees nearly all *Pinus rigida*. Oct. 13.

Herbs

Andropogon scoparius Y	*Solidago odora* Y
Pteris aquilina Y	*Scirpus cyperinus* Y
Ammophila arenaria Y	*Chrysopsis falcata* Y
Ionactis linariifolius Y	(*Ambrosia artemisiifolia*)
Deschampsia flexuosa Y	(*Asclepias Syriaca*) Y
Baptisia tinctoria Y	*Scirpus Americanus*
Carex Pennsylvanica	(*Plantago lanceolata*)
(*Daucus Carota*) X	*Euthamia tenuifolia* Y
Lysimachia quadrifolia	(*Leontodon autumnalis*) Y
(*Agrostis alba*?) Y	*Eriophorum Virginicum*? Y

* Comparatively little has been published about the occurrence of this rather unique plant on Cape Cod. G. B. Emerson, in his classic report on the trees and shrubs of Massachusetts (1846), had no record of it from east of Plymouth, but Thoreau found it about that time in Provincetown and near Highland Light in Truro. J. H. Redfield, in summing up the known distribution of the species in 1884 (Bull. Torrey Bot. Club 11 : 99), stated that Dr. Watson had seen it near Truro and one of the coves of Buzzard Bay. Dr. Hollick reported it from Provincetown in 1902 in the paper cited, and Mr. Collins (Rhodora 11 : 128. 1909) mentioned it as frequent and showy in spring in Eastham. Mr. Knowlton showed me a considerable quantity of it beside the main road in the northern edge of Eastham.

Pinus rigida is at present more abundant than all other trees combined, and although some of it is known to have been planted, it is safe to assume that it was always the Cape's commonest tree. Evergreens are therefore in the majority among the trees. The great difference in evergreenness between shrubs and undershrubs is noteworthy, and probably due to the same cause as in Michigan, namely, the latter are protected by snow in winter.* Most of the vines and shrubs have berries, while wind-borne seeds are in overwhelming majority among the herbs. Tonoboles are nearly as scarce as in northern Michigan,* and barbed fruits rare and chiefly

Barren sandy plains in north edge of Eastham, with stunted *Pinus rigida* (mostly about six feet tall), and in the foreground *Corema,* which however does not show very plainly, because the light was poor. Oct. 14.

confined to weeds.

Persons familiar with Long Island vegetation will recognize at once that nearly all of these plants grow also on that island, with approximately the same relative abundance. Most of them are common also as far south as the mountains of Georgia. A list of plants common in the interior of New England and rare or absent on the Cape would be a long one, but the following are the most

* See Bull. Torrey Club **45**: 41. 1918.

conspicuous examples among the woody plants that occur to me: *Pinus Strobus, Tsuga, Juniperus depressa, Hicoria, Betula* spp., *Alnus, Fagus, Castanea, Quercus montana, Ulmus, Liriodendron, Rhus glabra, Tilia, Fraxinus.* (Where a generic name stands alone it means that no species of that genus is common on the Cape.)

Most of these probably prefer richer soils than the average of those on Cape Cod, while a few are partial to rocky places. The climate may be a little too warm for *Pinus Strobus,* for that is also comparatively scarce in Connecticut and almost unknown outside of cultivation on Long Island. Although I have not visited the Cape in spring, I would expect to find most of the handsome spring flowers that are characteristic of rich shady woods nearly throughout the eastern United States rare or absent there too.

Although few species may be added to the known flora of Cape Cod hereafter by floristic botanists, and most of the vegetation has been more or less altered by civilization, there are still many problems in plant sociology, demography, geography, and ecology there that will amply repay investigation by persons interested in such matters.

OBSERVATIONS ON THE SPORES OF *SCHIZOPHYLLUM COMMUNE*

J. F. Adams

This cosmopolitan fungus is classified in the white spore group of agarics. The hymenium appears to vary in color apparently depending on age. Young sporophores have flesh-colored hymenia, while in the more mature the color may be white to purplish cinereous.

In 1917 I* observed in cultures of mature sporophores that where the spores were shed in mass upon the agar surface they were pink or distinctly salmon in color. The mass of spores making forty spore prints from material collected in the field.

* Mem. Torrey Bot. Club 17: 326–333. 1918.

appeared slimy and so striking in color that at first it was thought to be a contamination of some bacterial growth.

This year I have had opportunity to support this observation by The material was secured at various times from sporophores growing on a beech stump. The successful contrast for color of the

spores as well as spore prints was obtained on black glazed paper. A number of spore prints from sporophores of various ages is shown in the figure.

The sporophores were placed upon the black glazed paper under bell jars at room temperature. In order to secure a perfect print it is necessary to select sporophores which will lie flat on the paper.

When the hymenium is concave the part not touching the paper fails to show a perfect impression of the lamellae.

Sporophores collected in January and February in a frozen condition were most favorable material for spore prints. The frozen sporophores under room temperature thaw out quickly and in four hours a light spore print is obtained. In twelve to twenty-four hours a heavy spore print would be made. The heavy spore prints brought out the dominant pink or salmon color of the spore mass. Material collected in March, but which had become dried out several times with exposure, was not so favorable for spore prints. Such sporophores collected early in the morning and still moist would not show spore prints until after eight or ten hours at room temperature. Attempts to secure spore prints at higher temperature, such as over a steam radiator, were negative. It would appear that a gradual drying is the condition favorable for spore discharge rather than sudden drying out.

The use of black glazed paper was found most favorable for demonstrating spore prints as well as the pink color of the spore mass. The characteristic split lamella is well illustrated by the spore prints. With respect to the color of the spore mass, this agaric would appear to be related with the rhodosporae rather than the leucosporae.

Since this fungus is so cosmopolitan material can be secured for class demonstration at times when field agarics are not available.

SHORTER NOTES

Another Sonchus for America.—The genus *Sonchus* is not known to be native in the Western Hemisphere. There are nearly fifty species known from the Old World, and only three—all rather coarse weeds—have heretofore become widely naturalized in America. A fourth species is locally naturalized in southern California. Last summer, however, a fifth species, *Sonchus uliginosus,* a native of southern Russia, was found established in fields in Northampton County, Pennsylvania. We have specimens, preserved in

the herbarium of The New York Botanical Garden, collected near Hecktown, Pennsylvania, by Eugene A. Rau, July 21, 1921.

JOHN K. SMALL.

A HIGH-SCHOOL FLOWER SHOW.—On September 30, October 1 and 2 the high schools of New York City held a flower show at the American Museum of Natural History that was in some respects unique. The show, intended to stimulate interest among high-school pupils in wild and cultivated flowers, was in charge of the Biology Teachers' Association. Over twenty high schools co-operated. In some schools the pupils brought the flowers to the school on Thursday morning and an exhibit was arranged in the school for the day, the flowers being sent to the museum after school. Much of the work of arranging the exhibits, as well as the collecting of material, was done by pupils. In addition to the display of dahlias and other cultivated flowers; of asters, golden rods, grasses, fall berries and foliage; fruits and vegetables from home and school gardens; there was an attractive display of posters made by pupils in the various schools. As was to be expected, the finest show was made by schools in the outlying parts of the city, Jamaica and Newtown High Schools having especially attractive exhibits. Those in charge of the show consider it to have been of sufficient value to their pupils to warrant making it an annual event.

G. T. HASTINGS.

PROCEEDINGS OF THE CLUB

MEETING OF APRIL 27, 1921

The following were proposed for membership and afterwards elected:

Miss L. F. Allabach, Pittsburgh, Pa.; Miss Mary L. Mann, New York City; Mr. C. C. Whedon, New York City.

Announcement was made of the death on January 14, 1921, of Prof. E. T. Harper, of Geneseo, Illinois.

The scientific program consisted of three papers:

Miss L. O. Gaiser discussed the "Method of Cell-division in Pollen-mother Cells of Plants." Her study was based chiefly upon processes observed in *Anthurium*.

Dr. Michael Levine considered "The Relation of the Host Plant to the Size of the Crown Galls of the Beet." He illustrated his discussion with views showing the size and different forms of crown gall observed. The fact chiefly emphasized was that the largest tumors develop on the largest and most vigorous hosts. Plants well nourished, especially if on enriched soil, suffer severely.

Mr. C. A. Schwarze discussed "Cleavage Processes in the Sporangia of Certain Fungi." The spore formation in *Olpidiopsis* was carefully described and illustrated. Cleavage furrows cutting outward from a central vacuole cut up the protoplasm into spores. The method of spore formation by means of cleavage furrows was described for *Circinella minor, Sporodinia grandis,* and *Mucor racemosus,* and compared with the method of spore formation by cleavage furrows in *Olpidiopsis* and *Saprolegnia.* It was shown that in all the forms studied the cleavage is progressive. The formation of the columella in the Zygomycetes was accounted for in a manner differing from that described and illustrated in some of our standard textbooks.

Meeting of May 10, 1921

Mr. Leroy Jeffers gave an illustrated lecture on "Mountaineering in the Pacific Northwest, with especial reference to the flora of Mount Rainier." He showed an extensive series of views of magnificent mountain scenery, largely of alpine meadows and glaciers. Detailed views of plants were shown, or more usually views of these massed in their native settings. Lupines, Rhododendrons, Cassiope, Castillejas, Xerophyllum, were some of the most interesting. The speaker had climbed many peaks of the Northwest and his photographs were excellent in technique.

Meeting of May 25, 1921

The meeting of the Torrey Botanical Club was held jointly with the Wild Flower Preservation Society at the Mansion, New York Botanical Garden.

The following were elected to membership: Miss Margaret Chapin, Brooklyn, N. Y.; Dr. Philip A. Munz, Pomona College, Claremont, Calif.; Dr. George M. Reed, Brooklyn Botanic Garden, Brooklyn, N. Y.

A report was presented by the Secretary showing that our effort to raise by subscription $1,000 before May 1st, in order to obtain a conditional gift of $1,000, had been completely successful. Thanks to the interest of ninety-four members and friends, we were then assured of $2,094.63. This Special Fund for the support of the publications of the Torrey Botanical Club furnishes timely and most appreciated support.

As further gifts to the Club, mention may be made of the fact that this year, from May to December, the secretary and treasurer are offering their services *gratis*. Our editors have always served without stipend, a long-continuing donation of value.

Dr. J. N. Rose read the President's proclamation setting apart the week of May 22–28 as Forest Protection Week. Dr. M. A. Howe offered the following resolution which was approved and adopted by the Club:

"The Torrey Botanical Club heartily indorses the action of the President of the United States in setting apart the week beginning May 22, 1921, as Forest Protection Week. In addition to the obvious economic waste and the menace of future timber shortage caused by destructive and preventable forest fires, the Torrey Botanical Club sees in them also a source of irreparable damage to scenic beauty and to many of the most interesting and attractive elements in our native flora. The Club pledges its best efforts to create and maintain public sentiment that will lead to the effective preservation of the forests of America."

The address of the afternoon was a discussion by Prof. William L. Bray of "The Native Vegetation of New York State." This considered the development of the plant life and was well illustrated by lantern slides.

Meeting of October 11, 1921

The following persons were proposed for membership and afterwards elected: F. H. Baldwin, New York City; Augustus O.

Bourn, New York City; Kenneth R. Boynton, New York City; James Alfred Crawford, New York City; Mrs. John Ross Delafield, Riverdale, New York City; Prof. E. J. Durand, University of Minnesota, Minneapolis, Minn.; Miss Bessie Goldstein, New York City; Prof. Arthur de Jaczenski, Perspective Anglaise 29, Petrograd, Russia; Mrs. A. C. Langmuir, Hastings-on-Hudson, N. Y.; Miss Ruth Langmuir, Hastings-on-Hudson, N. Y.; Miss Dorothy O. Miller, Brooklyn, N. Y.

Since the date of the last meeting the Club has lost by death Mr. H. A. Cassebeer, Jr., of Steinway, Long Island, and Mr. George V. Nash, Head Gardener of the New York Botanical Garden.

The scientific program of the evening consisted of informal reports on the summer's botanical work and observations.

Dr. Roland M. Harper told of observations in Florida, Alabama, Virginia, Pennsylvania, New Jersey, New York, and Connecticut. In Florida he determined the proportion of ash in *Tillandsia usneoides*, which, being an epiphyte on trees, might be supposed to be unfavorably situated for taking up mineral substances. The ash, however, was found to constitute from 3 to 5 per cent of the dry weight, which is about the same percentage as in many other plants. In the central part of Alabama he noted *Sarracenia rubra* and other bog plants previously known only near the coast. In a canoe trip down the Warrior River, *Hymenocallis coronaria*, not included in Small's Flora of the Southeastern United States, was observed. On Lookout Mountain a variety of *Sarracenia flava* was found growing in wet crevices of rocks, an unusual habitat.

Mr. A. T. Beals spoke of experiences on Long Trail, which runs north and south in Vermont along the main crest of the Green Mountains. On Camel's Hump he collected *Blindia acuta*. He found *Dryopteris fragrans* on the "Nose" of Mt. Mansfield and was impressed by the alpine gardens of *Sphagnum* and *Polytrichum* at that point. Later, about the base of Mt. Royal, in Montreal, he noted *Epipactis viridiflora*, and near the Lake of the Trembling Mountain, about a hundred miles northwest of Montreal, he found beautifully fruiting specimens of *Leucobryum*

glaucum, which were exhibited. On a more recent excursion to Staten Island the minute mosses *Nanomitrium Austini* and *Ephemerum spinulosum* were among the plants collected.

Mr. W. W. Eggleston told of a field meeting with the Vermont Botanical Club at Willoughby Lake in July and of finding *Woodsia glabella, Woodsia alpina, Asplenium viride, Dryopteris Goldieana, Polystichum Braunii* and *Botrychium simplex*. In the spring he made a visit to the mountains of southwestern Virginia to investigate for the Bureau of Plant Industry three plants that were suspected of being poisonous to cattle. These were *Delphinium tricorne, Bicuculla Cucullaria,* and *B. canadensis.* The first two were found to be very poisonous, the last slightly so. In the case of *Bicuculla Cucullaria* most of the poison seems to be in the bulbs, which are commonly lifted with the foliage by cattle, but are left in the ground by nibbling sheep.

Messrs. Raymond H. Torrey and C. C. Whedon reported that *Bicuculla Cucullaria* is still to be found in the northern part of Manhattan Island.

Professor R. A. Harper had noted a peculiar *Aecidium* on *Bicuculla* in Van Cortland Park.

Professor Tracy E. Hazen spoke briefly of an undescribed genus of filamentous fresh-water green algae related to *Uronema.* It was found first in greenhouses in New York and later in a ditch at Englewood, N. J. The past summer he had collected it also in pools at Burlington, Vt., and Woods Hole, Mass. One peculiarity of a second species of the genus is a periodic rotation of its lobed chloroplast, this movement occurring night and day, and being apparently independent of light conditions.

Professor R. A. Harper reported the occurrence of *Pediastrum triangulum* in plankton of Devil's Lake, North Dakota, which is being studied by Dr. George T. Moore. It had previously been known only from Germany.

Miss Anna Runge mentioned finding luxuriant masses of *Habenaria lacera* and *Calopogon pulchellus* on Marthas Vineyard.

Miss Dorothy Oak referred to the occurrence of two species of *Drosera* in the town of Orleans on Cape Cod.

INDEX TO VOLUME TWENTY-ONE

(The names of species and varieties described as new and of new combinations are in **bold face type.**

Names of contributors to the Special Fund for the Support of Publications listed on pages 70 and 71 are not indexed. The Plants of Burnham's and Latham's Flora of the Town of Southold, pages 1–11, 28–33, are also omitted from the index.)

The Torrey Botanical Club

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OTHER PUBLICATIONS

OF THE

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(1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 47, published in 1920, contained 598 pages of text and 17 full-page plates. Price $4.00 per annum. For Europe, $4.25. Dulau & Co., 47 Soho Square, London, are agents for England.

Of former volumes, 24–47 can be supplied separately at $4.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (40 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–17 are now completed. The subscription price is fixed at $3.00 per volume in advance; Vol. 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00. Certain numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

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